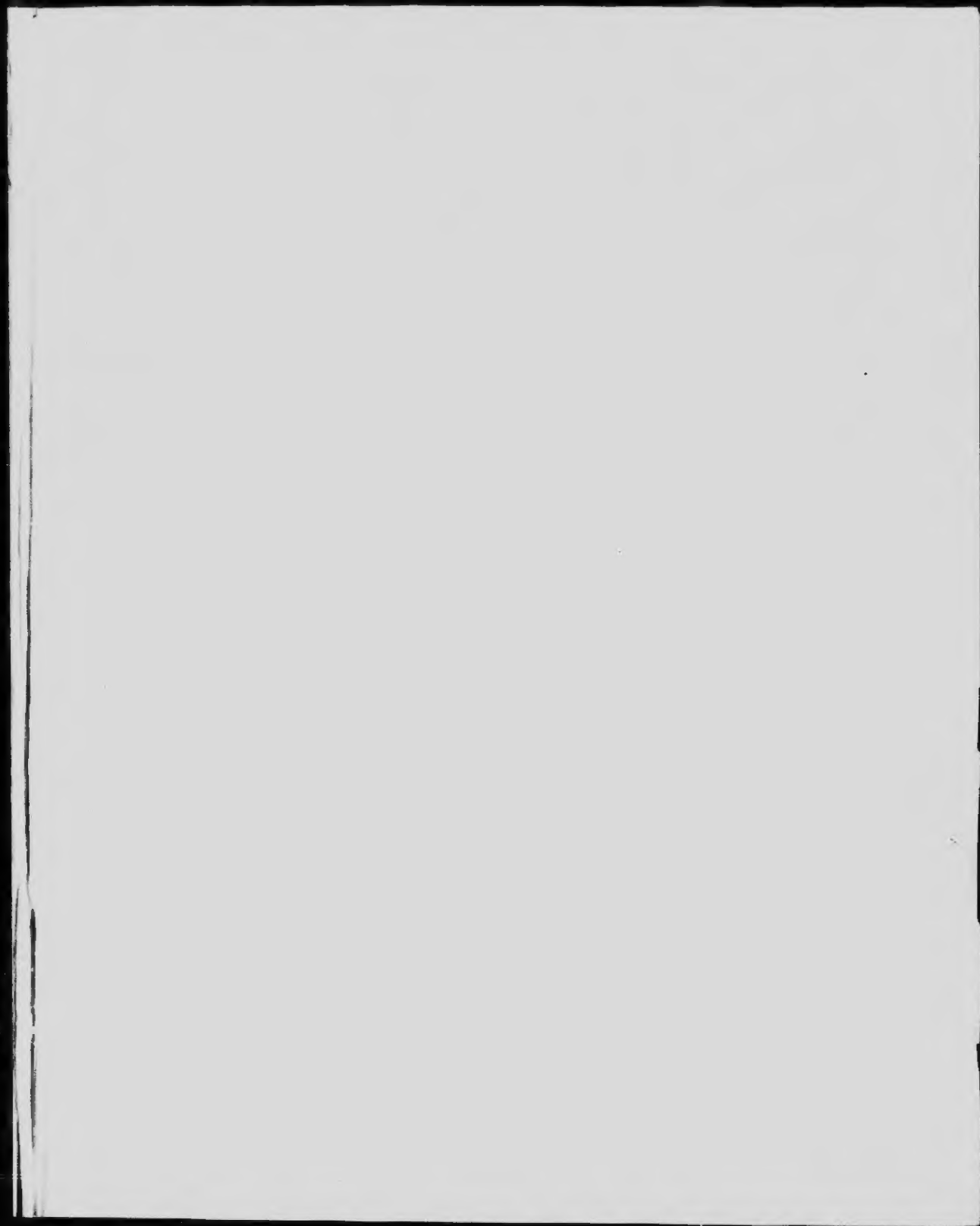
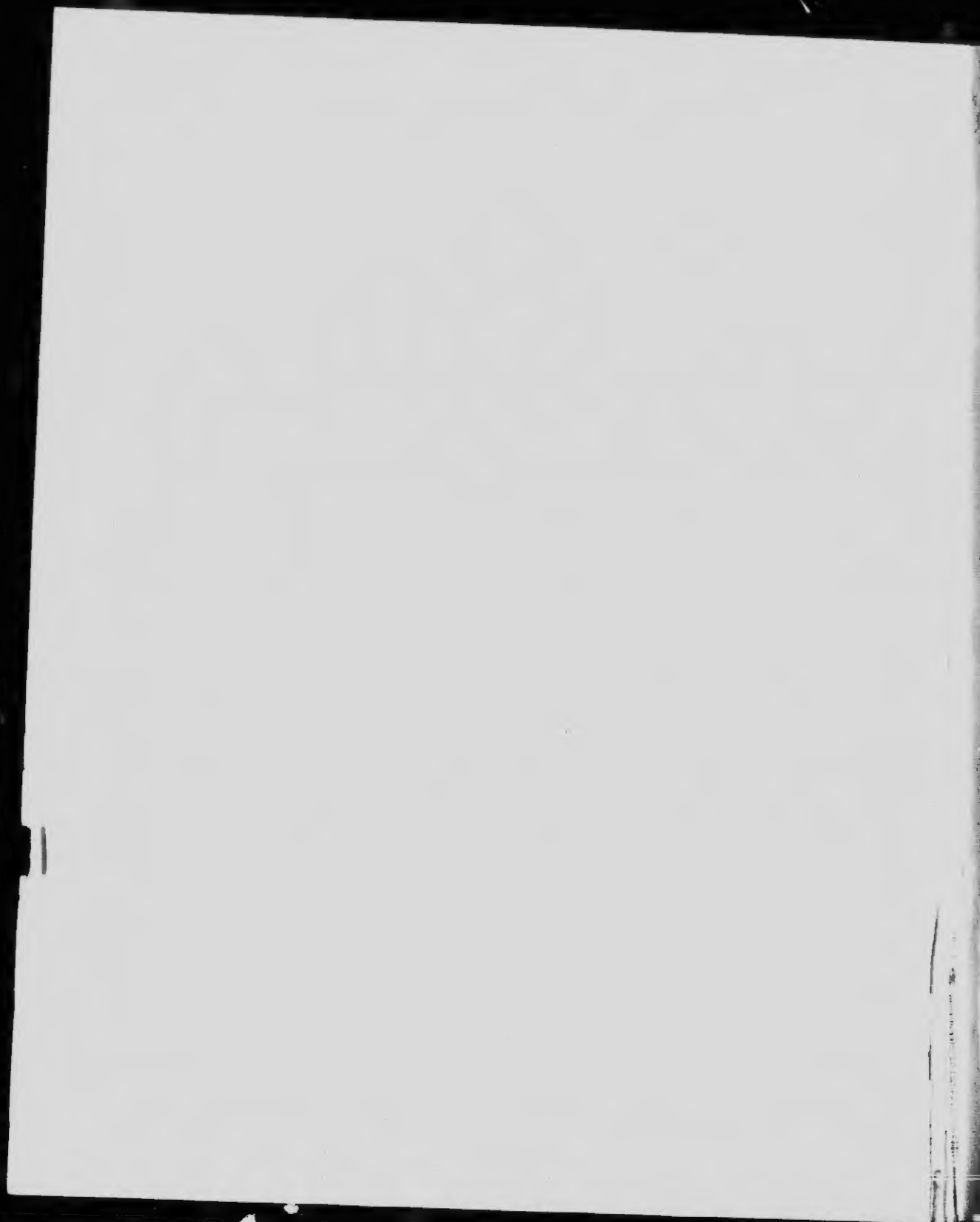


PRANG'S NEW GRADED COURSE
IN DRAWING FOR CANADIAN
SCHOOLS

TEACHER'S MANUAL

W. J. GAGE & CO. LIMITED
TORONTO





W. J. Gage & Co.'s Educational Series

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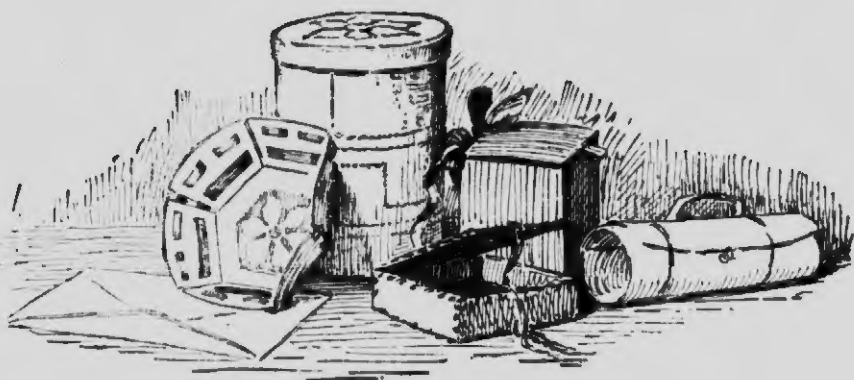


W. J. GAGE & COMPANY, LIMITED
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PREFACE.

THIS course of instruction presents a means of mental development indispensable in the education of every child, as leading to a knowledge and appreciation of the beautiful.

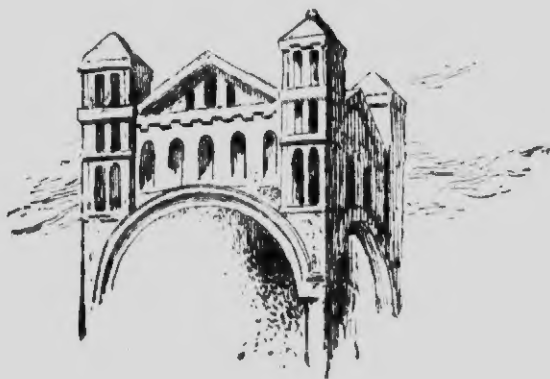
The editors have arranged the work of this Course with special reference to Canadian conditions. Drawing is used as a means of training the eye and hand and as a language by which the pupil not only expresses but impresses his thought. Still further, in the "making" required in the study of the models and objects, the ability to use the hands is trained and encouraged, the creative faculties are developed, and thus manual training, with all its healthful influences, is begun. Pupils going through this Course will not only be led, through the cultivation of their observing powers, to take a lively interest in the forms of objects around them, but will also become conscious of the power of expressing their ideas of such forms by drawing, whether with regard to their facts as seen in

working-drawings, to their appearance as seen in pictures, or to their decoration; at the same time, while the eye has been trained to observe, and the hand to draw, the mind has been constantly unfolding through perception, thought and expression.

Still further, it is a distinct aim in this Course to lead pupils to an appreciation and love of the beautiful as found in Nature and as expressed in the hand-work of man. What man has done, what he has created, is Art.

It is hoped that the work in this Course may lead teachers and pupils to a free use of Drawing and Color as an aid in other studies. Drawing, especially, should be as much at the command of every teacher and every pupil as writing and speaking, and should be as freely used.

Teachers should seek every opportunity to apply the work in other studies, and encourage pupils to use it as a means of expression generally in their school lessons.





THE THREE DIVISIONS OF ART STUDY.

I. REPRESENTATION.

Representation is the science and art of delineating or representing objects as they appear to the eye. It concerns picture-making. The *appearance* of the form of an object, seen from one standpoint, may be very different from the facts of its form. It must be recognized that instruction in drawing the appearance of objects must relate primarily to instruction in *seeing*, and that pupils fail in drawing the appearance of objects more from inability to *see* than from inability to draw. In general, all persons not trained to habits of correct *seeing* are predisposed toward drawing or representing the appearance of objects according to the idea of the facts of the form which the sense of touch has fixed in the mind. This is easily accounted for by the fact that, until within a very few years, it has been thought that the appearance of an object must be entirely drawn from a knowledge of principles instead of through seeing. The drawing of the appearance was therefore

postponed until pupils were ready to learn perspective. Such a postponement is now considered uneducational, and pupils are now led first to see the appearance of objects, and then to show by drawing what they have discovered through seeing. Many pupils will have had no previous opportunity for such work; special stress must be laid, therefore, on work in seeing.

But Representation of visible things is not all. The art is more truly called an expressive art,—the art of expressing conceptions,—for it enables a person to express by drawing ideas of things not really existing—a noble thought or a beautiful idea. The power to think the thought and conceive the idea is inborn; but the power to represent the thought by drawing must be acquired, and generally comes only by careful training.

II. DECORATION.

Decoration is the science and art of producing beauty in ornament by means of well-composed spaces and harmonious arrangements of lines, of masses of light and dark, and of color.

Ornament, the product of purely decorative art, is always employed to beautify objects created for some purpose, independent of their decoration. It is truly an expression of love for the object—a desire to make it beautiful. It produces its legitimate effect when, without concentration upon itself, it makes the object to which it is applied more pleasing than it is when unadorned.

Fitness to its purpose is the underlying principle—the very corner-stone of all good ornament. From this principle of fitness for its purpose there arises the fundamental law of

ornament—subordination. This law requires THAT ALL ORNAMENT SHALL BE MODEST AND MODERATE. Strong contrasts and striking effects violate it. Illustrations of this requirement in matters of good taste in general are familiar to all. A loud voice in conversation is not excusable; a forward, self-asserting manner is a mark of ill-breeding. This requirement holds good in all ornament, whether architectural, domestic or personal. He is not well dressed whose dress is conspicuous; that house is not well furnished where the furniture is obtrusive; that building is not well ornamented whose decoration is not subordinate to the idea of the building.

The study of historic ornament leads more and more to its interpretation as a visible manifestation of the history, life and spirit of the people who produced it. The contact of various nations or peoples, either through war, commerce or travel, can be traced in their ornament; and it is an evidence in the various phases of progress and civilization.

III. CONSTRUCTION.

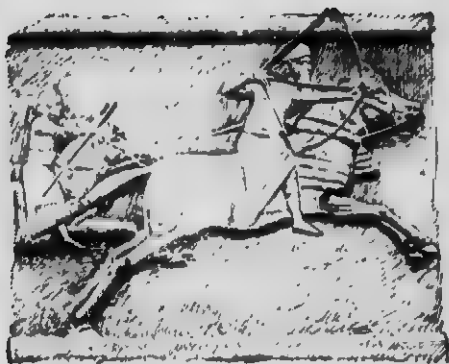
Construction deals with the facts of form, and shows the use which is made of these facts in the world of industry. Its importance, both educationally and practically, cannot be too strongly emphasized.

Construction as used in graphic study is the science and art of making drawings which give the facts of objects and from which objects may be constructed. These are called working-drawings, and are necessary to guide the workman in nearly every branch of manufacture.

The practical value of constructive drawing will be more

and more recognized as knowledge grows of the way in which ideas of form, that is to say, constructive designs, are expressed so as to be carried out in manufacture and industry. Every detail of building construction, from the stone foundation and the beams to the finished exterior views of the house, or church or cathedral, has first to be imagined, and then shown by working-drawings; from these drawings the builders work. Every new invention, from the simplest detail in machinery to a great engine as a whole, must, before it can be made practical, not only be thought out, but also be expressed and be made intelligible through working-drawings. It is through working-drawings that every new object manufactured is made possible, is materialized, so to speak. Designs for all landscape gardening and outdoor improvements—roads, parks, drives, etc.—must be expressed in working-drawings, that they may be carried out by workmen. The great works of civil and mining engineering depend upon working-drawings for their proper completion. There is no walk in life in which a knowledge of the methods of expression underlying working-drawings, and the ability to interpret them, are not of service.

But beyond the practical benefits arising from a knowledge of constructive drawing, there lies the great educational value in the subject of construction well presented. It calls for most accurate observation, most careful consideration of the relation of parts and of form values, of the adaptation of form to purpose, of agreeableness and beauty of form—all in the service of the creative imagination. The principles which govern the expression of thought in the subject of construction are fixed, and take their place among the exact sciences.



GENERAL DIRECTIONS.

DRAWING.

Freedom of Movement.—The importance of freedom of movement in drawing cannot be overestimated. It produces lightness of touch, quickness in execution, begets confidence in one's ability to draw, and when acquired by a class of pupils materially lessens the work of the teacher. The ability to sketch rapidly and easily cannot be attained without it.

A set of drawing-books, finished as draughtsmen would finish them, rarely indicates the best teaching. It is of far more importance that the child should have opportunity to work first for freedom of movement rather than for straightness of line.

Position.—The children should sit on the left half of the seat facing the desk. They should sit erect, feet flat on the floor, the eyes never nearer the paper than is necessary for a clear view of the lines. They should not bend forward unnecessarily, and should learn to work at a distance, as thus they can get a better idea of their work as a whole. In drawing at the blackboard, children should stand at arm's length from the board.

Pencil.—For general work Gage's Imperial Art pencil M is recommended. For work in light and shade, color, pencil-painting and all methods of artistic rendering, the Imperial Art S M is especially effective. Young children should be led to use such a pencil with restraint so as not to get extreme effects; that is, the rendering too heavy and black. The pencil should be used for drawing only. Short pencils should not be used.

For ordinary work, the pencil should be held lightly three or four inches from the point, so that it will have the support of the middle finger and be held by the thumb and forefinger, as shown in the illustration. Lead the pupils to attain this pencil-holding from a desire to draw freely and well.



FIG. 1.

The pupils should be led to see that frequent erasing injures the surface of the paper and the eraser is disastrous when applied to shade or shadow, therefore it is better to draw at first with very light lines, correcting these if necessary by drawing other light lines over them. When a satisfactory outline (or blocking of the whole) is secured then the pupil may proceed to carry out the effect desired, any obtrusively incorrect lines being first taken out with an eraser.

For *pencil-painting*, where the drawing is done in mass with broad intermingling strokes, the pencil should be held under the fingers as shown in Fig. 2.



FIG. 2.

Practice Paper—It is desirable that pupils should have some practice in free movement in addition to the work in the drawing-book. Quick sketches by the pupils fix in the mind the purpose of an exercise where, as in the pose or animal study, the lines of action may be studied from life preliminary to work in the drawing-book. For such purposes sheets of manilla paper, six by nine inches, are desirable. The sheets may be used on both sides for drawing. Provision should be made for twenty-five to thirty sheets for each pupil for use with one drawing-book. The teacher should guard against too much practice preliminary to exercises in the drawing-book lest the children lose interest and the spontaneity of their effort suffer.

Water-Colors.—Water-color paints are furnished to the schools in various forms. There are liquid paints in bottles, moist water-color paints in tubes, and paint-boxes with cakes of paint. Perhaps the most practical for general use in the primary school is a paint-box with three colors of excellent quality.*

For all line work in ink or water-color the brush should be held as nearly vertical as possible, with the fingers slightly resting upon the paper and the whole arm moved instead of merely the fingers. Broad washes are obtained by charging the brush with considerable water and color and working with the side and not the point of the brush. To obtain control and power of expression, it is well to encourage even young children to use the brush in both ways.

How to Use Water-Color.—Washes may be laid perfectly flat by working with the brush full of wet color, beginning at the top of the figure and carrying the color across the enclosing space from left to right, inclining the paper slightly and dragging the color down as it pools. The excess of color at the lower edge may be lifted with the brush if the brush is nearly dry.

A graded wash from the full tone to a pale tint may be laid by starting with a brush full of color (very wet) and carrying the tone as far down as the full depth of the color is desired, then by adding water and no more color every time the brush starts from the left to the right, the full tone will change, giving a graded effect ending in a pale tint. Long vertical oblongs are excellent for this exercise.

When expressing in a pictorial way, the work should be as individual as possible, that is, the children should express as they individually see. It would be a mistake for the teacher to give directions or definite advice as to what colors to combine or juxtapose to give the exact tint or tone of a flower, leaf or stem, as different children may see or feel the color differently. One child sees

* The Prang Water-Color Box No. 1 is recommended. This box contains three cakes of fine quality and extra size,—one each of red, yellow and blue. The colors work easily and smoothly and mix readily into secondaries, tertiaries and intermediates and broken colors. They are put up in attractive boxes with hinged covers. Two quill brushes of good quality and generous size, with wooden handles, are included in each box. The inside of the box cover is finished for use as a palette with three divisions.

green in the shadows or a glow in the reflected light, and should express what he sees as well as he can. One child sees red in the stem and he puts it there; another sees the same part as brown, into his red he touches a bit of blue and perhaps of yellow. In such work children should be encouraged to work as much as possible directly from the paint, avoiding much mixing.

Be careful to use clean water, that is, water not charged with much color by previous mixing; and always put the brushes and box away quite clean.

A hollow sponge held in the left hand is useful to remove superfluous color from the brush, thus keeping the water clean.

Do not leave brushes in the water or put them in the mouth. When ready to put the brush away, wash it thoroughly in clean water and give it a quick shake; this removes the water, while bringing the brush to a point and preserving its shape.

BOOK I.

The printed pattern-sheets furnished with the book may be used at the teacher's discretion whenever they will be most helpful to the work in hand.

In cutting the pattern for the sphere, the two pieces which fit together to cover a ball are best made from leather, for practical use in playing a game. If some pupils wish to make spherical pin-cushions they will find the same pattern available used in woollen or silk. (Allow extra for the turned-in seams.)

The cube pattern can be creased and glued to make a hollow model of paper. Cut only on the broad black lines. Crease on the narrower lines. When cut and creased the pattern will be found to be provided with "laps" to be pasted or glued, holding the form steadily in place. In pasting, push the laps *inside* the form so that they will not be in sight when the cube is finished.

Page 1. REPRESENTATION. -The Study and Drawing of Grasses.

This exercise is suggested for the opening of the school year, to make a pleasant connecting link between life out of doors and work in school. Many school children who live in the country or in small towns have never actually observed the common grasses in such a way as to realize the delicate perfection of their growth and the grace and beauty of their appearance in leaf and in flower.

The teacher should especially try to help pupils to notice the differing characters of the common grasses, *i.e.*, to become acquainted with them, to notice which kinds stand stiff and straight, which bend and sway gracefully in a breeze, which have light, feathery heads, which have drooping heads, etc., etc.

The grasses brought in by pupils should be arranged in an upright position like that in which they grow *not* lying flat on the desk. An easy way of arranging them is to shut the lower part of the stems between the leaves of a fairly thick book, and then set the book upright on the pupil's desk, or, better still, on a desk at a little distance so that the general effect may be seen without too many details.

Page 2. REPRESENTATION. -Familiar Objects.

Let the drawing for page 2 be from simple, familiar objects that are spheric, hemispheric or cylindric in form. If possible have each pupil draw from objects on his own desk. The objects chosen may be familiar manufactured articles or they may be fruits and vegetables.

The illustrations give hints as to the way to make round objects *look* round even in a simple pencil drawing. In the picture of the ball, the slightly darker lines at one side suggest that that side was in shadow.

It will be found a good plan to have the first experimental drawings made on practice paper if time allows. Encourage pupils in making home sketches of spheric objects and in collecting illustrations of objects from newspapers, catalogues, magazines, etc.

Page 3. REPRESENTATION.—Nature Study. Grouping.

Have the pupils bring fruits or vegetables to school ready for the lesson. Let them arrange their own groups. Help them to see that to get the best effect they should put together things that naturally belong together. Onions, beets, and turnips make a more pleasing group than turnips and grapes. Pupils should group together things whose forms look well together. For instance, one large squash and one small potato would make each other look like dwarf and giant; a single large object in a group usually needs more than one small object near it to make a good group. Consider also the arrangement with reference to carrying the eye into the picture. Placing one object farther back than another suggests distance into the picture, which is always pleasing.

It is necessary that one object should be more noticeable than others in order to have the eye at once attracted. The principal object in a picture may not be consciously observed first, but the eye finds there a resting-place; if, on the contrary, there are two or three objects equally prominent, the eye is distracted and the attention wanders. The principal object should be rendered by drawing in such a way as to attract the eye at once. The lines should be not only the darkest in the group, but also the most definite.

Page 4. REPRESENTATION.—Cube or Cubical Object.

Study cubes made from patterns. Have the pupils hold these cubes in different positions and observe how many faces can be seen at once. Have the cube held or placed so that two faces are visible. Have it held so that three faces are visible. Draw what is seen, just as it looks.

If preferred, have the drawings made from familiar objects that are cubic in shape, *e.g.*, boxes, baskets, inkstands, paper-weights, etc., etc.

Encourage pupils to make quick sketches of many different cubic objects (using practice paper or common manilla paper) so as to get practice in observing form. If such objects look as if they were falling off the paper toward the observer, the top faces are probably drawn too wide in

proportion to the rest of the picture. Do not perplex pupils at this stage of the work with rules for perspective, but let them simply try to tell truthfully with their pencils what they have seen with their eyes.

In drawing any cubic object, the effect of solidity is helped out by making the edges farthest away a little fainter, the nearest edges a little stronger and clearer.

Page 5. REPRESENTATION. Familiar Forms.

Supply each pupil with two or three models and let one drawing be made showing the appearance of the group. If the spheres are placed on the cubes, special pains will have to be taken to so pose them that the group will hold its position steadily. A small brass curtain ring or a common rubber band laid on the cube as a rest for the sphere will prevent the latter from rolling.

After a first trial on practice paper, draw in the books, remembering to make light lines at first and bring them out with due character and accent only after the outline has been correctly made and unnecessary lines removed.

If some pupils are disposed to do extra sketching, ask them for other drawings on practice paper or in sketch-books showing the same combination of models but showing the cube turned at a different angle. Ask them to watch for combinations of these two forms (or of slight modifications of the same forms) and make sketches of them. Gateposts and newel posts at the head and foot of staircases often show a spheric form surmounting a square prism or a cylinder.

Page 6. REPRESENTATION.—Grouping Models.

Before they begin to draw let the pupils experiment briefly with their cylindric models or objects to see how the apparent shape of the circular top varies according to its position. Pupils should be led to see that though the actual shape is a circle it appears like a flattened circle or ellipse; and the more nearly it is on a level with the eye the narrower this ellipse appears.

Have the pupils also study briefly the outline of the lower edge of their cylindric objects. Try to help them to see that when the object is held so high that its bottom is on a level with the eye its outline looks like a horizontal line, but that, as it is gradually lowered, the outline appears to curve downward, the curve growing fuller as the object is placed lower.

Let one or two quick sketches be made on the practice paper to secure correct proportion of the objects and proper curvature of the upper and lower edges.

Arrange a group of two or three models, including the cylinder, and draw the group.

Page 7. REPRESENTATION.—Review or Optional Exercise.

In arranging a group of models or of objects, the following directions are helpful :

(1) Choose one for the principal object, and, generally, place it centrally but not exactly in the centre ; (2) do not place the other objects in a straight line with the principal object ; (3) try the effect of placing the objects so that if the centres of their bases were connected an irregular figure would be made ; (4) place them as if they were good friends and belonged together, and (5) so that they will appear at rest. But remember (6) that the objects should not have the same positions, that is, their axes should not be all upright or all horizontal ; they should not be parallel nor at right angles to each other ; and they should not present exactly the same faces ; and (7) one of the objects should be partially hidden behind another, even if there are no more than two objects in the group. Look now (8) to see if in the group that you have made the objects will appear of the same height when drawn. If so, change them, for the effect will not be pleasing. By skilful questioning, the pupils can be led to these points. The effect of distance into the picture, obtained by the placing of some of the objects farther back than others, can be expressed in the drawing by making the lines for the farther objects somewhat lighter and less definite than those of the principal and nearer objects.

If it is preferred to review the study of the cube, let models or simple cubical objects be studied in various positions. It will be well to make first several quick sketches on practice paper.

Try to have pupils first observe carefully, then draw boldly, making all sketches of good size and placing them well in the space allowed.

Encourage home sketching and the collection of pictures of objects resembling the cube.

Page 8. DECORATION.—Good Arrangement. Beautiful Spaces.

Let the pupils consider the size of the space on the drawing-book page, and plan for the size of the two squares that are to be drawn on the page. The thought of space relations must come in even in this preliminary planning. The size of the squares to look well in the space, the width of the margin about them, and the relative width of the space between them must receive thoughtful consideration. Every drawing exercise should include such study of space relations.

Show simple plaids in gingham or other textiles. Let pupils draw on practice paper squares of the size decided upon for the drawing-book page. Lead them to think how they would arrange lines in these squares to make a pleasing division of the space, using two horizontal and two vertical lines. Let them express these thoughts by drawing first on practice paper with pencil or with brush, then in the drawing-book. Encourage individual work. The exercise aims to find the child's own feeling for the underlying principle of beauty in the arrangement, be it ever so crudely expressed.

If the exercise consists of the arrangement and copying of a verse, lead the children to think carefully before they begin to work. Preliminary experiment, on practice paper the same size as the page, will be helpful.

Page 9. DECORATION.—Space Division. Plaids.

See the suggestions for the work of the preceding page.

Show examples of plaids in woven or printed fabrics, so that it may be seen how others have expressed the thought of line arrangements.

The children may plan for two squares to be well placed on the drawing-book page. Lead them to make a quick sketch of the squares on practice paper, giving thoughtful consideration to their size and to the intervening and surrounding spaces.

Some other arrangement than a check should be chosen. A check is the arrangement of equal squares and is the simplest form of a plaid. The examples presented may serve as suggestions. If the spaces are too nearly of the same size the design may be commonplace. Let them sketch the designs in the squares on their practice paper, trying more than one if they desire, then draw in the book, using pencil or brush and ink.

Page 10. DECORATION.—Examples for Study.

The examples on the upper half of the page are of ancient origin. The line borders tell of the fine sense of beauty in space-relations among Egyptian and Chinese artists centuries ago. The bit of ornament between the borders shows Egyptian love of symbolism. It means the sacred river Nile. The zigzag lines were made to suggest the rolling waters of the stream, and out of these waters rose the buds and blossoms of the lotus, a plant resembling our water-lily. To the Egyptians it was a reminder of their own immortality, growing as it did out of the mud of their mysterious river.

The tile designs, in the lower corners of the page, are studies of squares and circles, arranged with thought for beautiful proportions and beautiful contrasts of light and dark. The other tile designs show arrangements of squares within squares, with a suggestion of the effects of varying dark and light. The surface covering shows a well-considered repetition of one figure, covering the ground without crowding. It was designed from a plant-form.

Page 11. DECORATION.—Optional Exercise.

If one of the borders is chosen to be copied, let it be enlarged to three inches in width and carried across the page. If the square tile is chosen for study, two designs may be drawn in the given space.

In making modifications of a given design remember that beauty of proportion and arrangement is the end desired. Mere novelty may be ugly and uninteresting.

Page 12. REPRESENTATION.—Pose Drawing.

Direct pupils' study of the illustration so that they may see what is most important and helpful. Notice how few lines the artist used, yet these few tell the whole story. See how the principal wrinkles in shirt and trousers express the muscular action; those in the back show the upward pull of the right arm; those in the right elbow suggest the bending of the right arm; those at thigh and at knee show that the figure is not a stiff china doll, but a live boy who sits and stands at will. (Avoid choosing for a model a boy in a perfectly new and unwrinkled suit. It will be difficult to avoid the china-doll appearance. Clothes showing honest, legitimate wear—not abuse—have much more character, from the artistic point of view.) Notice the slight indications of hair. Very few lines are used, yet the effect is that of a proper growth of short hair.

In studying the model, lead pupils to notice proportion first,—to see how large the head is compared with the width of the shoulders; how width of shoulders compares with the whole height of the figure; how length of arms and legs (or apparent length if they appear foreshortened) compares with the whole height. Have careful study given to the apparent shape of the feet. Pupils will often find them appearing very different from feet seen in profile, but the only way to make them look real is to draw them as they actually appear.

Let the first sketches be made on practice paper. They will be crude, but should enable pupils to do much better on a second attempt. The drawing in the book may be from the same subject or a different one. The purpose is not to produce a perfect drawing, but to learn to see essentials and to express essentials vigorously.

Page 13. REPRESENTATION.—Imaginative Drawing.

Let pupils make drawings to illustrate some familiar story or verse. The figure in the corner of the page, for example, represents Little Red

Riding-Hood on the way to her grandmother's. If preferred let the pupils use for a theme the kind of work they would like to do.

Keep the work as simple as possible, try to express what is most important and leave out non-essentials. Make only one drawing on the book-page, and have that of good size, well arranged in the space.

Page 14. CONSTRUCTION.—Pattern Drawing. Freehand.

Supply pupils with models of the cube and let them study its surface, deciding how many faces the pattern must show, of what shape and how joined to each other. Let the first work be on practice paper; allow pupils to turn the models over and over on the paper, impressing their edges so as to show four of the square faces in a row. The two additional squares (patterns for the end faces) might be shown attached to any one of the first four squares, but the arrangement shown in the illustrations is a particular'y good one. If the right-hand square were omitted and the others drawn, making a pattern shaped like a Greek cross, the bending and fastening of the sides in place would produce a hollow cube open at the top.

In actual work, the arrangement of the faces would depend partly on the shape and quantity of material at hand. Economy has to be considered in all industrial art.

After the pattern has been clearly thought out and shown once by drawing on practice paper, let it be drawn once more on page 14 in the book. Let pupils plan the size of their pattern so that it will neatly occupy the space provided, without being cramped for room. Have pupils draw first in light lines; then, when complete, finish in firmer lines of even width and color.

Page 15. CONSTRUCTION.—Proportion. Use of Ruler.

If time allows, give additional practice in the study of proportions, asking pupils to estimate proportions first, and then determine them exactly, by measurement. Doors, window-frames, blackboards, desks, book-covers, etc.,

make excellent material for such work. The training thus given to the judgment is valuable in all kinds of drawing.

Additional practice in the use of the ruler for exact lines is also desirable; but, at this stage of the work, pupils should practically depend most on free-hand drawing. Their work in Representation should invariably be freehand.

Page 16. CONSTRUCTION.—Pattern Drawing.

The pattern of a square prism can be developed by creasing the faces in paper around the wooden model. In this exercise the pupils can join. It is better, as far as possible, to have the pupils develop all exercises first through their own activities, as the work then lays stronger hold of them than when they simply observe what you do.

The pattern may also be developed before a class by placing an oblong face of the model upright against the blackboard and rolling it from face to face until each of the four oblong faces has touched the board, then turning it up till the upper square face has touched the board, then down until the lower square face has touched the board. The square faces may join any one of the oblong faces. In practical work economy of space and material has almost always to be carefully considered when using a pattern, so the pattern itself is planned in such a way as to allow its repetitions to fit into each other with as little waste as may be.

Let the proportions of the pattern be definitely decided and followed, either the proportions of the wooden model or other proportions clearly understood by pupils. The drawing should be finished in lines of even width and strength.

Page 17. CONSTRUCTION.—Optional Exercise. Review.

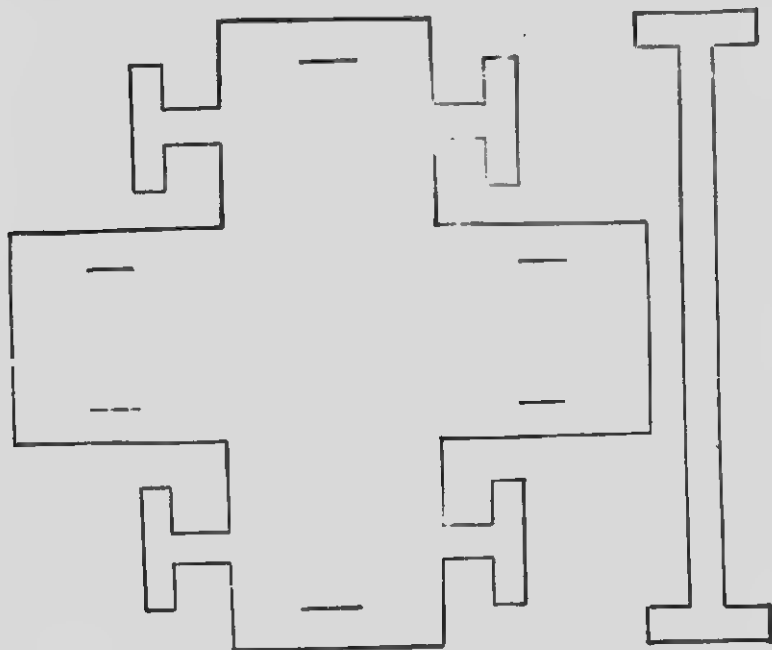
The cubic basket illustrated on the drawing-book page can be easily and neatly made from a sheet of manilla practice paper or a leaf of note-paper, and may serve as text and starting-point for the exercise of individual imagination in creating new forms.

A pattern for this basket is given here. The short horizontal lines within the outline represent simple slits cut with a knife or with one scissors-blade.

used like a knife. If the pattern is drawn on a piece of 6 x 9 practice paper the basket itself will require a portion 6 x 6 ; the handle should be cut out of the remaining piece. Note that each of the four sides should be two inches square, a base also two inches square occupying the centre of the pattern. Each arm, including the cross-piece at its extremity, should extend about three-quarters of an inch from the edge of the side out of which it reaches.

After drawing and cutting out the flat sheet *all in one piece*, crease the base-line of each of the four sides and bring the sides up at right angles with the bottom of the basket. Next, fold the little cross-pieces at the ends of the arms over, as one folds his own arms across his breast. This makes it possible for each arm, when drawn around the nearest corner, to be pushed through the

slit found in the adjoining side. Let it be pushed through *from the outside* towards the inside (see illustration). After it is through, unfold the cross-piece at its extremity to keep it from slipping back. Do the same with the other three arms.



the handle. Reduce the width of the handle-ends temporarily by doubling their cross-pieces back as in the case of the basket. Push the handle ends through *from the outside* toward the inside, and unfold the cross-pieces to

retain the handle in place. The illustration shows the appearance of the completed basket.

The proportions of the basket are capable of much variation. When made of fairly tough paper it is a really convenient little receptacle for many sorts of trifles. Neatly made, it is appropriate for Christmas candies or for May-day flowers.

Children may like to take the baskets home and repeat the work in different materials. The more inventive will perhaps like to experiment until they succeed in making, after the same general plan, a box with a separate cover.

An Envelope. If an envelope is chosen as the subject of the exercise, let the first drawing be on practice paper. Decide on the kind of envelope to be designed, whether for a friendly letter, a photograph, or for specimens of seeds. Bring out, through pupils' discussion of the subject, that if the envelope is for a letter it may be either a broad oblong (fitting a sheet folded only once) or a narrower oblong (fitting a sheet folded twice), but that it should open along its broader side for the sake of ease in taking out the letter. If the envelope is for holding fine sand or seeds it would better open along its narrower side in order to avoid spilling the contents. Opinions may very likely differ in regard to the best opening for an envelope to hold a photograph. Lead pupils to think of beauty as an essential object in the design. An envelope may be awkward and clumsy or graceful and pleasing in its proportions according to the designer's taste. The curvature of the flaps also calls for the exercise of judgment and taste. It will be of great assistance if the teacher and the pupils collect envelopes of various patterns and sizes for study. There are many more ways of shaping an envelope than one realizes before looking into the matter.

Let pupils work over this first drawing till shape, proportion and details are all believed to be satisfactory for the particular sort of envelope needed. Then have the same pattern carefully considered with relation to the size of the drawing-book page and drawn once more on page 17 with such improvements as experience may have suggested.

Page 18. REPRESENTATION.—Grouping.

See page 16 of this manual for suggestions in regard to the grouping of models or objects.

Notice, in the illustration on page 18 of the drawing-book, how a few lines of just the right sort, rightly used, make the glass vessel actually *look* glassy. When artists speak of rendering the texture of a surface they mean doing just this,—making glass look glassy, making fur look like fur, making the delicate, satiny petals of a poppy and the rough bark of an old apple tree look like just what they are. The art of doing this has to be learned gradually through study both of the things themselves and of good drawings done by others. Pupils may be early interested in looking for examples of good drawing, and their increasing appreciation of what is good will be a help toward good work on their own part.

Page 19. REPRESENTATION. Grouping. Rendering.

Try to have pupils think for themselves and discover by experiment just how they can make their drawings suggest the characteristic appearance of whatever they study.

Page 20. REPRESENTATION.—Flowers from Nature.

Many pleasant opportunities for the use of drawing occur to the teacher who is interested in nature study. Budding twigs of trees and shrubs, in different stages of growth toward full leafage, give material both for profitable science study and for practice in artistic sketching. It is a good plan to distinguish clearly between botanical drawing and artistic sketching. For instance, a first pictorial sketch might aim to give only the general effect of the budded twig as a whole, its main lines of growth, the characteristic angles at which its buds and branches start out, and



FIG. d. Decorative Treatment of a Flower.



FIG. e. Pictorial Drawing of a Flower.



FIG. f. Botanical Study of a Flower.



FIG. g. Decorative Treatment of a Grass.

the texture of the buds, hard and smooth, or furry, or delicate and silky as the case may be. The aim of this pictorial sketch should be to bring out the character, life and beauty of the twig without showing all its anatomical particulars. Afterward let a second drawing be made showing all the details discoverable by close examination—possibly by microscopic examination. Let the second drawing, the botanical drawing, be a complete memorandum of all the facts about the twig which can be set down in a graphic representation. Such botanical drawing, while it lacks the beauty and poetic quality of the artistic sketch, is of great value in its own way. The difference between the two is comparable to the difference between the scientific description of the formation of ice as given in text-books on physics and a poet's description of the formation of ice as in Lowell's account of the frozen brook in his "Vision of Sir Launfal." See the illustrations, Figs. *e* and *f*, on page 25 of this manual.

Still another way of using flowers is what artists call their decorative treatment, that is to say, their use, not so much for a picture as for filling beautifully some given space. See Figs. *d* and *g*. In these cases, the aim was to produce a beautiful arrangement of lines and of masses of light and dark. The result obtained is not simply an illustration of flowers or grasses, but a beautiful composition,—a pleasing effect, first as a whole, then as to the balance of parts and the distribution of light and dark.

Page 21. REPRESENTATION.—Optional Exercise. Animals.

If pet animals can be studied, direct attention chiefly to the thought of proportions and action, as being most important.

If preferred, additional study may be given to plant-growth, continuing the work of page 20.

Page 22. REPRESENTATION.—Out-of-Door Pictures.

Study carefully the illustrations on pages 22 and 23 of the drawing book. Notice especially their simplicity. A great deal is told by the use of very few lines. Notice also the beautiful placing of these few lines, making pleasant divisions of the picture space.

Copy one of the illustrations, enlarged to suit the blank space on the page.

Encourage pupils to try to make simple out-of-door sketches from nature and to bring them in for criticism.

Page 23. REPRESENTATION.—Space Relations in Landscape.

Lead pupils to see the relationship between the principal lines of a picture and its enclosing outline or "frame." If the subject of the picture is to have chief consideration, that usually decides the shape of the whole, as *e.g.*, a broad, horizontal oblong, a narrow, vertical oblong, a circle, etc. But very often a space of definitely fixed shape and proportions may be given; then the picture itself may need to be changed in order to be beautiful in that particular place.

Let the pupils draw on page 23 two oblongs differing from those printed and also from each other. Have them adapt one of the given landscapes to both these new spaces, making such changes in the relations of the lines as may seem desirable.

If water-colors or wax-crayons can be used, let the two compositions be very simply colored. Use not more than three colors, *e.g.* green for the grass, blue for water, and a paler blue for sky.

Page 24. PICTURE STUDY.

The study of Drawing is meant to help children to grow in power of appreciation as well as in power of execution. The study of really good pictures should, therefore, be carried on in each grade, and the subjects chosen should be carefully selected so that they may be attractive and reasonably intelligible to pupils of average capacity. When in doubt as to choice, always present what seems to be intrinsically the best. Children often show unexpected ability to recognize the greatness of a real master.

Pictures closely related to the children's own experience of life are specially desirable for the lower grades.

Do not give ready-made information at first, but let the pupils enjoy the pictures in their own way, telling what they see and what they like. Afterwards the teacher may profitably add some ideas of interest or direct attention to some beauty which the children did not see for themselves.

The first picture in Book I. is reproduced from a painting by the English artist, **Sir Edwin Landseer** (1802-1873). It is the portrait of a hound owned by Lady Blessington—waiting at the foot of a flight of stairs for his mistress. The perfection with which his body is drawn and the anxious, listening pose of the intelligent head have made the picture famous.

Jean François Millet (1814-1875), who drew in pastel the picture of "The First Step," devoted years of patient, ill-paid work to the study of his peasant neighbors in France. He was born and brought up in the country and always loved the plain, simple ways of living that he saw around him. In later years he became known as a great man, and his studies of peasant life have done a great deal to help other people to find nobility and beauty in common things.

The children will be interested to see the wooden shoes worn by the father and mother, and they will readily imagine the story which the attitudes suggest.

Anton Van Dyck (1599-1641) was a Flemish painter. He spent several years in England and was knighted by Charles I. The little James, Duke of York, whose portrait is represented in the drawing-book, was a son of Charles I. and afterwards became king of England (James II.) This print was made from a crayon copy of Van Dyck's painting, so it shows two signatures—that of the painter and that of the Italian copyist. The complete picture shows a group of three children.

Children usually enjoy telling what they know and like about a picture. The study of any good reproduction gives an excellent subject for a language lesson, either oral or written.

BOOK II.

The Pattern Page.—The square prism pattern will be found helpful for study in connection with the work suggested on pages 14 and 15 of the drawing-book.

Page 1. REPRESENTATION.—Sketching from Nature.

Have pupils provided with leafy twigs, branches or sprays for individual study. The more variety there is in the material the better, if all the specimens are fairly simple in their forms and their mode of growth. Have the sprays held in glasses of water or sand or caught between the leaves of a heavy book standing upright on the back of the desk. The general rule should be to give each spray a natural position, one in which it will feel at home. Try to have pupils look for and express the main essentials without putting in all the small details, but emphasize the need of truthfulness in those main essentials. It is not at all necessary to show all the veins and notches in the leaves, but it is necessary to make the leaves which are drawn appear to grow as they do grow, opposite each other or alternate with each other or in whorls upon the stem, according to the constitution of the particular plant that is being studied.

See pages 24-26 of this manual for suggestions on the difference between artistic sketches and drawing for purposes of botanical analysis.

Encourage all the outside sketching which pupils are willing to attempt. Let branches of seed vessels be drawn as well as branches of leaves and flowers.

Page 2. REPRESENTATION.—Hemisphere or Cylinder.

Do not give pupils rules for the correct drawing of these forms, but help them to see correctly for themselves. If they see truly, their drawing will be right. Experiment first with model cylinders held vertical. Ask pupils to hold these so that the upper plane face is just on a level with

the eye, and is therefore barely out of sight. Let them hold the vertical cylinder a little lower, so that they begin to see the upper plane face; what is its apparent shape? Move the cylinder still further below the eye level; what is its apparent shape now? How does it compare with that previously noticed? Holding the cylinder in this same position, notice the visible portion of the edge of the lower plane face; does it appear straight or curved? Does it appear more or less rounding than the corresponding curve in the edge of the upper face?

Try similar experiments with a horizontal cylinder turned a very little way from the observer. Move it gradually toward the left, bringing the right end more and more into view, watching for changes in the apparent shape of the right end and changes in the curvature in the edge of the left end.

Try similar experiments, holding the cylinder vertical again and moving it from a point on the level with the eye, gradually higher and higher, watching for changes in its appearance.

Try similar experiments with the hemisphere in different positions.

Take pains also to have pupils notice that the ellipses seen under these circumstances always have rounding ends, never pointed ends.

Have pupils draw the model cylinder or hemisphere, studying the curves and trying to draw them as they appear.

Page 3. REPRESENTATION.—Grouping.

Refer to page 16 of this manual for suggestions about grouping. See also the manual text for the last lesson, on the study of the cylinder and hemisphere.

Page 4. REPRESENTATION.—Angular Objects.

Have the models placed either vertical or horizontal, as preferred, but turned at an angle, not squarely facing the observer. Lead pupils to observe carefully the top face of the model as far as it is visible. They will be interested in discovering the peculiar shape it *appears* to have, a shape not

in the least like either a square or an oblong. Lead them to notice also the lower edges of the model and discover in what directions these edges extend; whether they slant equally or unequally; if unequally, which edge slants the more.

Speak of drawing as a species of language, a method of talking without sound. Ask pupils to tell with their pencils (first on practice paper) just how their models look. Perhaps no two models may look exactly alike. Each pupil should give an account of his own model.

If the horizontal square prism is very near the observer, he may be looking almost directly down upon it and his drawing be consequently awkward and ugly. This can be avoided by making a platform of books and placing the prism upon them, to get a more interesting and pleasing effect. Even where the top face actually appears very narrow, pupils are usually inclined to draw it too wide, hence the special desirability of care in placing for study.

Pupils should be encouraged to do home sketching and to collect printed illustrations showing similar forms. Encourage them to look at such illustrations critically; that is, to look for beauty and accuracy to be enjoyed and emulated, and also to look for faults to be avoided. Many hastily prepared illustrations found in advertising catalogues, etc., show the very same errors into which pupils fall; but if these errors are discovered as something to be shunned, their study will have a certain value of its own.

Page 5. REPRESENTATION. —Square Prism.

Continue the work of the preceding page. If practicable, it will be well to make several experimental studies in *seeing* and drawing on practice paper, preliminary to work in the book.

Page 6. REPRESENTATION. —Grouping.

Let this be first a lesson in *seeing*. Have several sketches made on practice paper before drawing in the books. The grouping may be altered each time so as to present a fresh problem.

Page 7. REPRESENTATION.—Review. Optional.

Notice, in the illustration on the drawing-book page, how the different kinds of lines used for the tea-pot and the tumbler show the difference between earthenware and delicate glass. Observe, too, how the fainter, incomplete line of the farther lower edge of the tumbler suggests its distance.

If decorated objects are used for study, let their ornament be as simple as possible and do not have it made conspicuous in the drawing. The forms studied and their relation to each other in the group should be the chief consideration.

Page 8. DECORATION. Space Divisions.

It will be well to make preliminary experiments on practice paper before drawing in the book.

If an original design is to be made for a tile, use for the underlying idea one of the skeleton outlines given on page 9. Keep the design very simple, using only straight lines. Finish in contrasting masses of light and dark. Use pencil or brush and ink.

Page 9. DECORATION.—Space Divisions. Light and Dark.

See suggestions for the preceding page. It would be a good plan to make two tile designs alike in space division, varying the arrangement of light and dark.

Designs of this nature have been used for centuries by workers in stone and wood, producing mosaic or "parquetry" floors and wall-surfaces, contrasts of color being produced by different kinds of wood or stone.

Page 10. DECORATION.—Examples for Study.

Pupils will like to look for decorative figures like those in the Gothic examples. They can often find them in carpets, book-covers, carved or painted woodwork, and especially in church buildings and furniture. This

quatrefoil (four-leaved) ornament was a special favorite of mediaeval cathedral-builders in Europe. They liked it both for its inherent beauty and for its association with church teachings about the Four Gospels which tell one great story.

The borders at the right and left are Egyptian, though the Greeks later made frequent use of a fret like Figure 1. The Egyptians put a solemn meaning into all their ornament with which we are now familiar, because it was ornament designed for temples, tombs and mummy-cases. The intricate course of the fret in Figure 1 meant to them the wanderings of the human soul through form after form. When the Greeks, later, designed the same or similar ornament, it is probable that they cared only for its beauty as a pattern.

Figures 1 and 3 show how simple contrasts of color may be expressed with the pencil.

Figure 4 is copied from an ancient Persian manuscript in the British Museum. Its origin is uncertain, but, in the original, the lower, stem-like part with the spreading leaves was colored green, the upper part rose-red, suggesting that its motive was probably a flower.

Figures 5 and 6 are studies in space-division pure and simple. It is interesting to see what beautiful effects can be produced with few lines and shapes.

Figure 7 is a pictorial sketch of the dwarf-cornel or "bunch-berry," used afterwards as a basis of the tile designs 8 and 9. Notice that 8 and 9 are *not* pictures, but show a decorative treatment of the general form of the growing plant. They also show what different effects may be produced by different arrangements of light and dark, while the actual space-division remains the same.

Figure 10, a design suitable for a printed silk or cotton stuff, was made by using the suggestion of a four-petaled flower or a whorl of four leaves

Page 11. DECORATION.—Optional Exercise.

If a border is chosen to be copied or used as a suggestion for original work, let the drawing be three inches deep and carried across the page, leaving good margins.

If a tile is chosen, two squares may be drawn in the given space, and a design arranged in each one.

A profitable exercise may be made of the study of a flower or a twig, as in figure 7, and its decorative treatment for a tile or a panel as in 8 and 9. Make the pictorial sketch at the left of page 11 and place the decorative panel at the right. Do not attempt elaborate designs. The simpler they are the better they are likely to be.

Page 12. REPRESENTATION.—Pose Drawing.

Refer to page 19 for general advice about exercises in pose drawing. The illustration on page 12 in the drawing-book is given to show simple and effective ways of drawing hair and clothing. Call attention to the lines of the dress in the lap; they show that the thigh is horizontal, and consequently make the girl *look* as if she were really sitting, and not simply leaning against the support. Lead pupils to notice also the lines in the sleeve near the elbow. They show that the arm is bent at the elbow joint. Without some such sign of muscular action the arm in its present length would be likely to look simply dwarfed in size.

Page 13. REPRESENTATION.—Imaginative Drawing.

An interesting theme for this exercise may often be found in the history, geography, or reading lesson recently studied.

Page 14. CONSTRUCTION.—Pattern Drawing.

A study of the printed pattern-sheet of the square prism will be helpful here. Let pupils think how the pattern would have to be modified to make a box with a hinged cover. Ask them to plan and draw on practice paper a pattern for such a box, making it of good proportions and, if possible, adapted to some definite use. Draw again on page 14, making such improvements as experience may suggest. Before beginning work on the book-page plan the size and placing of the pattern so that it may look well on the page. Draw freehand.

Page 15. CONSTRUCTION. —Pattern Drawing.

Repeat the general theme of page 14, drawing this time with the ruler, and aiming at exact measurement. Pupils will have new ideas about their patterns, and will see for themselves ways of improving on what is already done.

Page 16. CONSTRUCTION. —Pattern Drawing.

Each pupil should have on his desk a model of the right-angled triangular prism, from which he may study for himself how to draw the pattern for a similar (hollow) form of paper.

Do not tell the children what to draw, but lead them to tell how they will plan for the pattern, the number and shape of the parts of the pattern, and how they will arrange the joining of these parts to make the complete pattern. It is readily seen that there must be as many parts to the pattern as the prism has faces (five), and that these parts must correspond in size and shape to the faces — three oblong and two triangular. The joining of the parts may be made in several ways; lead the children to suggest these ways and to choose the one they think is best. In deciding this they must bear in mind not only the convenience of folding and pasting the pattern, but also the arrangement that will adapt the drawing of the pattern to the space on the drawing-book page. Try to have them carry the thought from the object itself to the thought of the pattern. The thought that the corresponding parts of the pattern must exactly coincide will help them in securing accurate proportion. Have them make a quick sketch, directing the principal thought to the matter of proportion. Now let them examine their drawings carefully and imagine them cut out and the parts fitted together. Such an exercise of the imagination will aid in developing the sense of proportion. Lead them to plan to adapt the size of the drawing to the space on the drawing-book page. Another quick sketch may be made, just enough to test the plan. Here again the children will recognize the advantage to be gained from being able to vary the scale of the drawing to adapt it to any given space, while by retaining the proportion the essential facts of the model are expressed. Let them sketch the pattern lightly, giving thoughtful attention to proportion, then finish with clear, careful lines.

Page 17. CONSTRUCTION.—Optional Exercise

See page 23 of this manual for suggestions about the designing of envelopes. So many different kinds of envelopes are useful for different purposes that several exercises might profitably be devoted to the subject.

Bear in mind that the purpose of such exercises is to develop the pupil's practical common sense, his constructive imagination, and his mastery over his own hands. If additional work in construction is desired for the class or for special individuals, a paper box made by folding and cutting, without the use of glue, will be found interesting. The pattern, as shown here, may be drawn on the board and copied to occupy a 6 x 6 square paper. Cutting should be done on the *heavy lines only*.

The light lines are for creasing and folding. A little familiarity with the pattern will enable ingenious pupils to fold without drawing the light lines at all. Make up, as shown in the sketch on the drawing-book page.

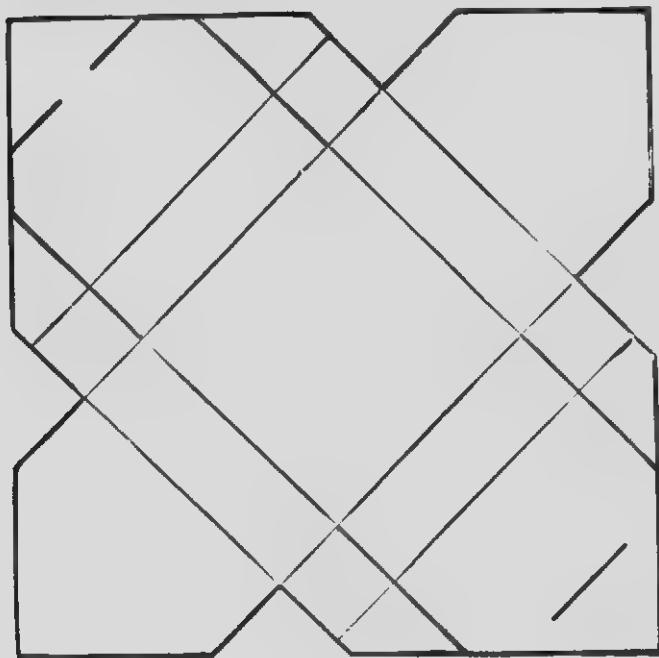


FIG. h.

This box was made from a six-inch square of paper according to the given pattern. The base is $2\frac{1}{2}$ in. x $2\frac{1}{2}$ in., the sides $\frac{3}{4}$ in. deep. The slits in the triangular corner flaps were cut $\frac{3}{4}$ in. from the vertices of the flaps.

Boxes made in this manner may show a great variety of forms according to the way in which base and sides are proportioned to each other. Beauty of proportion should always be aimed at.

Page 18. REPRESENTATION.—Grouping.

Refer to pages 14-16 of this manual for suggestions about the arrangement of groups of models or objects. Encourage pupils to arrange groups which shall give a pleasing effect and at the same time tell some story. For example, a boy's cap grouped with a top and two or three marbles might suggest "Spring is here." A tea-pot with a cup and a saucer might mean "Five o'clock tea." A candy-box and a spray of flowers might suggest "Somebody's birthday." Pupils will have good ideas of their own if once set to thinking.

The rendering of a group of objects—that is, the quality and the variety of line used—should be such as to suggest the leading ideas of a group. Therefore, in completing any drawing, keep in mind the whole thought which is to be expressed, and aim to express as far as possible, by the rendering, the same ideas that were especially considered in the arrangement of the group.

The rendering should be such as to show the relative importance of the parts of a group or a picture.

Page 19. REPRESENTATION.—Grouping. Rendering.

In artistic rendering in outline, the principal and the secondary objects, the nearer and the farther objects, the light and the shade, are all made manifest by the difference in quality and emphasis of line. The principal object has the strongest emphasis or accentuation, and all other objects receive less in proportion to their importance. This must be carefully borne in mind, for an eager worker often forgets the need for expressing the relation between the principal and the subordinate objects, and emphasizes all equally, producing a staring and "spotty" effect, quite different from that produced when a due regard is paid to subordination of the less important and appreciation of the more important parts. In the rendering of secondary objects strong contrasts should be avoided; the effects of the secondary objects as a whole should be subdued.

Page 20. REPRESENTATION.—Flowers from Nature.

See pages 24-26 of this manual.

Consider whether a vertical or a horizontal oblong will be more suitable for the particular flowers that are available for study. Draw two suitable oblongs on practice paper for preliminary experiments. Consider how the motive may be best arranged to make its contrasts with the open spaces agreeable; try to express the life and grace of the motive in the lines, masses, or colors; but keep all the treatment flat, without expression of light and shade. Study, however, the relation of light and dark.

Repeat on the drawing-book page, improving the composition as much as possible, but keeping it very simple. Finish with pencil, brush and ink or color. It will be interesting to use the same space arrangement for both oblongs, but to change the arrangement as to lights and darks. Notice the tulip compositions on the drawing-book page.

Page 21. REPRESENTATION.—Optional Lesson from Nature.

If pet animals are studied, give the chief thought to proportion and action. A very few lines may give the effect of life much better than a labored showing of all the details. Notice, in the illustrations, how the line used suggests fur rather than bare skin or hide.

If flowers are chosen for study, as motives for composition in oblong panels, let the pupils try several experiments on practice paper first. Each experiment will suggest another—perhaps a better—arrangement of spaces or of masses of dark and light.

If color can be used it will be interesting to fill in the spaces with flat tones, that is, tones of even strength, with no attempt at making the flower "stand out" from the background. Use only two colors, one for flowers, one for leaves, perhaps white for background. Or, the flowers may be left white on a colored background.

Page 22. REPRESENTATION. - Nature.

The purpose of copying here is to emphasize in pupils' minds the beauty of very simple drawing, well composed, to fill a given space. Why is a horizontal oblong especially appropriate for this seashore subject? Why was the composition marked B (drawing-book, page 23) given a vertical space?

Encourage pupils to try to make outline sketches out of doors.

Page 23. REPRESENTATION. -Space Relations in Landscape.

Study good pictures of landscapes for suggestions. Pupils in this grade should be able to work with greater intelligence on account of their longer study of the subject.

Page 24. PICTURE STUDY.

See the general suggestions regarding Picture Study on page 28 of this manual.

The study of good landscape pictures can do a great deal to open children's eyes to the beauty in their surroundings. At the same time it should show them how to try to make simple landscape drawings for themselves.

Jean François Millet (1814-1875) is known all over the world for his studies of the fields and homes of his native France. He was born a country boy, and he took great pleasure in drawing country children at their work and play. The "story" of this picture will be obvious to the pupils, but they may not notice at first some of the little touches which show the artist's keen appreciation of summer weather. See how the darkly shadowed side of the tree-trunk sets off, by contrast, the warm light flooding the field beyond where the man and oxen are at work. Notice how perfectly the cool, rippling water is indicated.

Children in this grade can begin to understand that a well-composed picture gives most space to that which is most interesting at the time. In Millet's drawing the artist wished us to think of the warm earth and the cool water, and he took most of the space for these, *suggesting* the sunshiny sky by the dark shadows. Let pupils study other landscape pictures as opportunity occurs.

BOOK III.

The Pattern Page. The paper boxes for which pattern sheets are given will be used in connection with the lessons in Construction, pages 14 to 17 of the drawing-book.

Page 1. REPRESENTATION.—Flowers or Fruit from Nature

Encourage pupils to bring in specimens from which choice may be made. Before these are gathered, talk with the pupils about the room there is for choice. Some are stunted and dwarfed, or are unbalanced, or are in some way blemished through accidents of growth. These should not be used. Ask the pupils to look for flowers or fruits that are unblemished and well developed. And then lead the pupils to see that there is not only choice as to the flower or fruit, but as to its appearance from different sides. Call attention also to the expressiveness of the leading lines of growth.

Let each pupil work from a subject which is at a little distance away, so as to get the general effect. If pupils draw from an object that is too near, they are likely to lose sight of the whole while giving undue attention to details.

Page 2. REPRESENTATION.—Cylindric Objects.

Let each pupil bring some simple cylindric object from home. Have the objects to be drawn placed on the pupils' desks as far from the eye as practicable. The drawings will be more pleasing if the objects are so placed that pupils do not see very far down inside. Sometimes it may be desirable to place the object on a book or a pile of books at the back of the desk to secure a good position for it.

Refer to page 30 of this manual for helps in studying cylindric objects.

Let one or two quick sketches be made on the practice paper to secure correct proportion of the objects and proper curvature of the upper and

lower edges. If the objects studied have handles, these will need specially careful observation.

Before drawing in the books, let pupils study the example in drawing-book, page 2.

This was drawn from a piece of heavy gray earthenware ornamented with simple horizontal bands of dark blue. See how the thickness of the ware is suggested at the top. Notice especially that the edge *rounds* over, showing that it would be pleasant to the lips and not sharp like a knife. A tin cup might have a much narrower edge, but that also would be sure to round a little for the sake of convenience and safety in drinking. The illustration also gives helps in rendering a handle of any thick material. Flat, ribbon-like handles present a slightly different problem and need careful observation. See drawing-book, page 4.

Draw lightly at first, making the sketch of proper size for the space. If the objects studied have elaborate ornament, leave that out.

Page 3. REPRESENTATION.—Grouping. Rendering.

See pages 14-16 of this manual for directions in regard to grouping, and page 37 for suggestions about artistic rendering.

Page 4. REPRESENTATION. Angular Objects.

Several simple baskets should be provided so that each child may see the appearance in an attractive way, involving not too much foreshortening. It would be well to have the baskets placed at quite a distance from the children in order to avoid the expression of too much detail, and with too much emphasis. Try to have the children understand that although a great number of splints or willows *can* be seen in some baskets, yet one does not see them all in their entirety in looking at the basket as a whole, just as when one looks at a tree, one does not see all the leaves; and to represent them in the drawing would not tell the truth of the appearance.

The tendency, in drawing a comparatively shallow, oblong basket, is to draw the top wider than it really appears. This matter may need special observation.

The appearance of a flat basket-handle, in the position shown by the illustration, also needs careful study. Notice how the farther edge of the handle disappears and then reappears. Study this in the object itself.

Page 5. REPRESENTATION.—Model Drawing.

Make several sketches of the model in different positions, using loose sheets of practice paper. When the observation has become fairly accurate let one large outline drawing be made, well placed on the drawing-book page.

Encourage all the out-of-school sketching the pupils will do *thoughtfully*. If they wish to attempt buildings with roofs like the sloping sides of triangular prisms, try to have them draw simple things, *i.e.*, barns and sheds, dog-kennels, chicken-coops and bird-houses, rather than dwellings with bay windows and piazzas, involving complicated problems of perspective. They will find that when a form like the triangular prism is above the level of the eyes, as is the case with most roofs, the edges appear to slant in a direction different from their direction when below the eye. Study of these variations in appearance makes an admirable practice in thoughtful *seeing*.

Page 6. REPRESENTATION.—Grouping.

Let this exercise be a review of the pupils' knowledge of the different forms. Experimental sketches on practice paper will quickly show which forms most need further observation.

Make one drawing on the page, with special care for good grouping and agreeable placing on the page.

Page 7. REPRESENTATION.—Review. Optional.

Help the pupils to select one or two beautiful objects, or a fine vase with a beautiful flower, and to arrange the study so that the light will bring out the greatest beauties of the objects.

To secure a condition favorable for good results, be sure that the pupils are far enough away from the examples studied to see their beauty

as a whole. Ask the pupils to study what they are about to draw, to place mentally the group within the space, and to consider how and where to get the best possible effect upon their space. If pupils did a little more thinking before starting to draw there would be fewer failures. Let all the first lines be very faint, just considerations of the space and the leading lines so as to avoid disturbing the texture of the paper by erasing.

Page 8. DECORATION. Space Relations.

Many of the best book-covers and pamphlet-covers depend for their beauty on good lettering, so placed as to make pleasing divisions of the space.

Keep to very simple designs, both of space-division and of lettering. As a rule, simple, easily legible letters are best. Elaborate novelties in the shape of letters are almost certain to be bad.

Page 9. DECORATION.—Space Relations.

The designs given on the drawing-book page suggest that a leaf or a four-petaled flower may have been used as a motive.

Let the pupils make experimental designs of their own, within square outlines, on practice paper, using plane geometric figures or taking hints from nature, as preferred. If leaves are used, avoid all elaborate cutting up of their outlines. When satisfactory results have been reached, let each pupil put his own designs on the drawing-book page. Two designs may be drawn, or one design may be given twice, with differing arrangements of dark and light.

If color can be used, it will be interesting to color the designs as if for earthenware tiles—blue on white or white on blue, dull yellow on brown, etc.

Page 10. DECORATION.—Examples for Study.

Lead the children to give thoughtful study to Figure 1 on the drawing-book page, to notice the grace of its flowing curves and the tangential union of all its lines, that is, to their growth out of each other. Leaf stalks always join the parent stem tangentially, or in a

direction which, if continued, would make leaf stalk and branches flow gently together, neither one cutting directly across the other. This tangential union of lines is also seen in the parts of a feather where they join the main rib, and in the mid-rib and veins of leaves.

Vigorous, round curves like those in the example were special favorites of the ancient Roman artists centuries ago. Scrolls like these were painted with the brush. In more elaborate forms they were carved in stone.

Figures 2, 3, and 4 show how designs for tiles or larger surfaces are based on some underlying geometric plan, in order to secure rhythm in the result. The underlying scheme or skeleton may be merely the division of the space into squares by means of vertical and horizontal lines (Figure 2); it may depend on a visible or imaginary skeleton of vertical, horizontal, and oblique lines, producing level squares and squares on their diagonals (Figure 3); it may depend on a network of circles just touching each other (Figure 4). There are many different ways in which the underlying plan of a surface pattern may be thought out.

Figure 5 shows the origin of the ideas used in working out the design of Figure 4. They were gathered from study of the flower and leaf of an Easter lily.

Page 11. DECORATION.—Optional Lesson from Page 10.

If the Roman scroll is chosen to be copied, special care should be given to the study of its proportions, in order that it may have the same character after being enlarged. The copy should be made three inches in depth and carried across the page, leaving good margins. Preliminary practice on loose sheets of paper will help pupils to get the spirit of the curves.

If pupils are provided with brushes, let them draw this scroll with brush and ink instead of with the pencil.

If preferred, two squares may be drawn on page 11 and used for tile designs or surface coverings. These may be copied from page 10 or made by thoughtful modification of the examples there given.

Page 12. REPRESENTATION.—Pose Drawing.

Pupils are always likely to draw feet and hands much too small. Lead them to study the proportions of the posed model. See manual, page 19.

Page 13. REPRESENTATION. Imaginative Drawing.

The purpose of exercises of this nature is to give pupils a chance to do free, creative work. Themes taken from the class work in history and literature are often most suggestive. Sometimes pupils like to illustrate bits of their own personal experience. Their discovery of their own limitations of power should make them the readier for serious application to work in the lessons which are more definitely guided.

Page 14. CONSTRUCTION.—View Drawing.

The pattern and the views of a model are very different. Views are *not* pictures of faces nor diagrams of faces. They are statements in regard to the space which a form occupies.

The front view shows how much space the form takes up from top to bottom and from left to right.

The top view shows how much space the form takes up from back to front and from left to right.

The side view shows how much space the form takes up from top to bottom and from back to front.

The teacher should keep this clearly in her own mind. A view may sometimes happen to give just the same shape and dimensions as the pattern of a face, as *e.g.* with the cube; but the one has no necessary resemblance to the other. For instance, the cylinder has no plane oblong face; yet a front view of the cylinder is expressed by an oblong, the height of the oblong showing the space occupied by the cylinder from top to bottom, and the width of the oblong showing the space occupied by the cylinder from left to right.

Let the diagrams on page 14 be observed with this distinction in mind.

Have the pupils make rapid freehand view-drawings of two different models on practice paper, in order to be sure they understand exactly what they are trying to tell by their drawings.

Page 15. CONSTRUCTION.—Working Drawing. Pattern.

The different kinds of lines given in the upper right corner of the drawing-book page are the principal "conventions" used in ordinary working drawings. A convention, in this sense of the word, means something arbitrarily fixed upon for a certain use and accepted by general consent and general practice. Three of these conventions—the full-edge line, the connecting line, and the measuring or dimension line—are used in the working drawing of the simple, oblong block, shown in the upper left corner of the page.

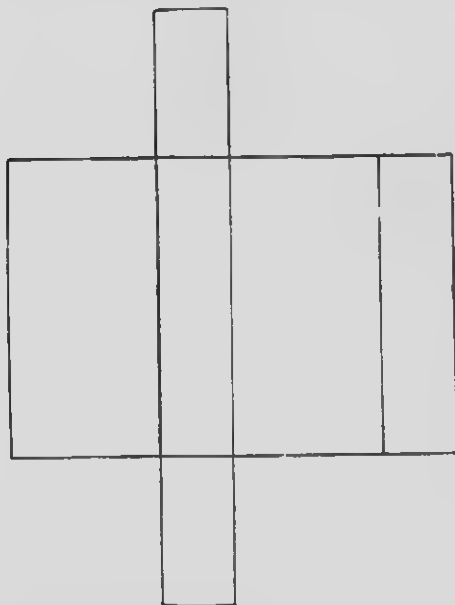


FIG. 1.

The pupils should first "read" the working drawing and know exactly what form it describes. Then they should think out for themselves the pattern for a similar form which might be made into a hollow model of paper. Figure 1 shows one way of drawing such a pattern—not the only correct way. One might begin with a narrow rather than a wide face; one might conceive the two smallest (end) pieces as attached to a wide rather than a narrow face; the practice in actual shop work would depend upon circumstances.

As an additional exercise, let pupils cut and make up the patterns for paper boxes given on the pattern-sheet in drawing-book No. 3. Then

let them study and draw on practice paper top, front and side views of each box.

Page 16. CONSTRUCTION. - Working Drawing.

A "view-drawing" becomes a complete working-drawing when dimension lines are added so that it gives all the particulars necessary for a practical workman's information and direction. Show the pupils that, while the view-drawings on the drawing-book page tell the facts of the form, as pure form, they give no hint as to size. The working drawings are definite. Let pupils read all the drawings on the page, telling in words exactly what the drawings tell in lines.

Make a working drawing of some simple, familiar object, showing two views. A simple match-box or a tin lunch box would make a good subject for study.

Read what is said on the inside of the drawing-book cover about drawing to scale.

Page 17. CONSTRUCTION.—Optional Exercise.

Study the boxes made up from the printed pattern sheet. Design and draw the pattern for another box, well adapted to some special use, *e.g.*, a pencil box, a glove box, a box for neckties, etc. Make the pattern according to a definite scale, allowing, *e.g.*, one half inch or one quarter inch in the pattern to a full inch in the imaginary box.

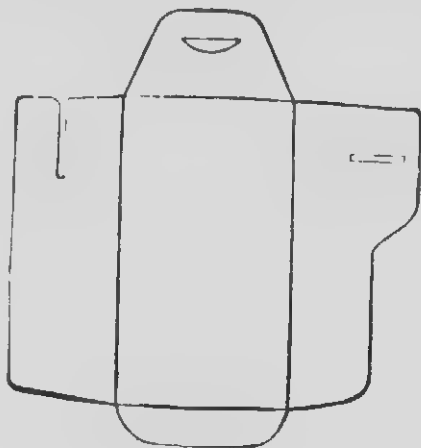


FIG. j.

Figure *j* is the pattern of the envelope illustrated on the drawing-book page.

If preferred, make a working drawing of some type model or familiar object. A working drawing of one of the triangular prisms will call for strict observation and close thought, but pupils of this age should be able

to master the problem. In order to start aright they should review their knowledge that views are *not* pictures nor diagrams of faces, but merely statements about the space occupied.

It will be a surprise to many pupils to see how much difference there may be between the faces and the views of a triangular prism. See Figures *k* and *l*.

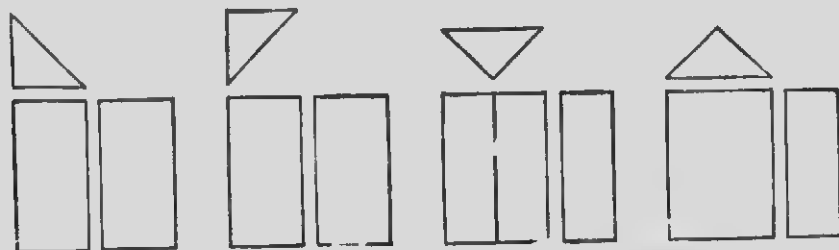


FIG. k. Views of a right-angled triangular prism in four different positions.

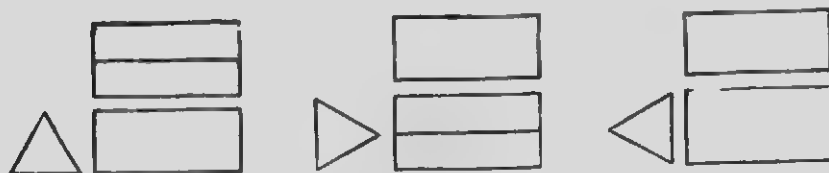


FIG. l. Views of an equilateral triangular prism in three different positions.

Page 18. REPRESENTATION.—Grouping.

Recall the suggestions of manual, pages 14-16, in regard to grouping.

Page 19. REPRESENTATION.—Grouping. Rendering.

Recall what was said on manual, page 24, in regard to rendering different materials by different kinds of line.

Page 20. REPRESENTATION.—Flowers from Nature.

Pages 24-26 of this manual explain the difference between pictorial sketches, botanical studies, and decorative treatment of a plant form.

Follow one of these methods. The illustration on the drawing-book page is a pictorial sketch very simply rendered in outline. The flower composition on the last page of the drawing-book are examples of decorative treatment. Their main object is to produce a beautiful arrangement of lines and of masses of dark and light, within an enclosing outline.

Page 21. REPRESENTATION.—Optional Lesson.

Continue the work of the preceding page, using a different flower for a motive. Use color if practicable.

If preferred, let this page be devoted to sketching a dog or other pet animal. Work for correct proportions and a life-like pose, but leave out unimportant details.

Page 22. REPRESENTATION.—Landscape.

Notice especially the simplicity of the rendering of tree-masses. If an original sketch is attempted, do not try to put in everything that is seen. Indicate only the most interesting aspects of the subject, as the sketch here indicates the open, hilly field, the cosy house just beyond its summit, the trees in friendly nearness, and the inviting pathway.

Page 23. REPRESENTATION.—Space Relations. Light and Dark in Landscape.

See the suggestions for similar exercises on page 38 of this manual. Work either in outline or in masses of light and dark. The outline composition may be colored if practicable.

Page 24. PICTURE STUDY.

See the general suggestions regarding Picture Study, on page 28 of this manual.

Children are naturally interested in drawing people whom they see, or remember, or imagine. The study of really good figure drawing may be made exceedingly helpful, as showing how artists proceed.

A charcoal drawing by the celebrated French painter, **Jean François Millet** (1814-1875), is given in the drawing-book. Millet had studied in Paris and knew the beautiful paintings of the old masters in the great picture galleries, but his heart was with the plain, hard-working country folk among whom he had spent his childhood; and he devoted his long life to studying and showing to others the dignity and courage and sweetness that may go with poverty and toil.

This peasant woman seems to be resting a moment before taking up her heavy burden. See how perfectly natural the pose is, and how few lines the artist used to tell the whole story.

Raphael Sanzio (Italy, 1483-1520) was one of the greatest artists that ever lived. Many of his pictures of the Madonna and Christ Child are well known all over the world. His drawing of the Piper shows the use four hundred years ago of something resembling our Scottish bag-pipes. Lead the pupils to study the principal lines of the figure and especially to notice the positions of the legs and feet. Let them experiment for themselves, and prove the truth of the artist's drawing. This will help them to put more life into their own drawings of persons walking or running.

The outline of the muscular arm, seen beside the Piper, shows how Raphael, like every great artist, was constantly observing and making quick sketches, in preparation for his more ambitious work. It was by means of such unremitting study that he became a master of his art.

The examples of Flower Composition should be studied chiefly for their beautiful space relations. In drawing flowers or grasses, the true purpose is not served unless both the flower and the vacant spaces around it are beautiful. As soon as children once grasp this idea, they realize that a good flower-composition has in it even more to enjoy than they at first supposed. The compositions reproduced on the drawing-book page are decorative in their general effect; but in pictorial drawing also thought should be given always to the placing of the flower so that the spaces around it will be pleasant to the eye. (See page 24 of this manual, where the difference between pictorial and decorative treatment is explained.)

The small flower panels by **Arthur Dow** are so well composed that they would be beautiful to look at merely as blots of black and white, if we did not recognize the flowers.

BOOK IV.

The Pattern Page. The pattern of the drinking-cup (the frustum of a hollow cone) will be needed for study in connection with pages 14-17 of the drawing-book.

Page 1. REPRESENTATION.—Flowers or Fruits from Nature.

The alderberry, snowberry, bitter sweet, and woodbine are good as selections. The fruitage, or seed vessels of the burdock, bugweed, shepherd's purse, milkweed and rose hips are all very beautiful and not only are interesting subjects for a drawing lesson, but are excellent as motives for decorative design and for treatment in ink and water-color.

"Weeds," as we call them, are often rare plants in some other country. We pass them by because they are so common, growing everywhere by the wayside, in the field or meadow.

See suggestions on page 13 of this manual in regard to the arrangement of specimens for study.

Lead pupils to see how the rendering of the clover head on the drawing-book page, by its very omission of details in the florets, gives a hint of bright sunshine falling on one side of the head as well as on the leaves. The heavier, darker lines on the farther side of the clover head suggest shadow there, and so, by contrast, make the other effect of sunshine all the stronger.

Page 2. REPRESENTATION.—Vase Forms.

Choose with great care the vase or vases to be studied, that the lesson may teach good taste as well as faithful observation. Good vase forms are not necessarily expensive. Sometimes a very inexpensive bit of glass or pottery is—by reason of its beautiful proportions and outlines—much more beautiful than a pretentious and costly piece of ornamented ware.

Page 3. REPRESENTATION.—Grouping. Rendering.

When pupils are arranging groups of objects for study, lead them to do it intelligently, with thought for:—

The place of the principal object.

The place of the secondary objects.

The figure made by the group on the ground or table.

Partial view of some of the objects.

Upper line of the group.

Variety in the positions of the axes and in the faces visible.

Repose of the objects.

Unity of the group—distance between objects.

Refer to pages 14 and 16 of this manual for more explicit directions if needed. For suggestions in regard to expressing "texture" or material, compare the line used on page 3 of the drawing-book to express glass, and that used on page 1 to express the clover-head.

It will be well to have preliminary sketches made on practice paper. The attempt to draw a group often leads one to discover a more pleasing arrangement.

Page 4. REPRESENTATION. —Angular Objects.

The appearance of an object as to outlines depends on two conditions:—

1. Its position in regard to the observer. 2. Its distance from the observer.

Position affects the apparent *form* of an object; distance affects the apparent *size*.

The apparent form of any object, except a perfect sphere, varies with every position in which it is placed in regard to the observer.

The apparent size of an object decreases as its distance from the observer increases.

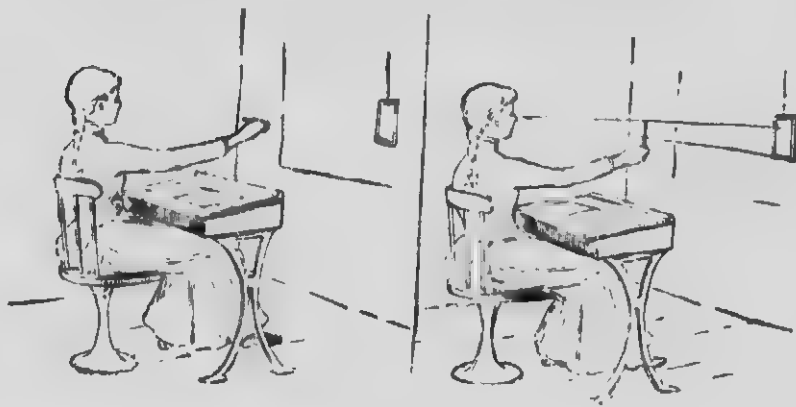


FIG. m.

Measurement on the Pencil.—The use of measurement on the pencil is to study *proportion*. If pupils do not already know how to measure on the pencil, the following practice is desirable. The teacher draws upon the board at the front of the room vertical oblongs of different proportions. If the schoolroom is wide, it will be better to have several such oblongs—some at the left, some in the middle, and some at the right end of the board. The teacher gives the following directions, and sees that each is intelligently carried out before proceeding to the next, explaining that the measurement to be taken first is the width of the oblong—next, the height of the oblong. The exercise may be varied by measuring objects in the room, as window-panes, door-panels, etc.

Remember that these measurements give *proportion* only, *not* size.

In measuring horizontally, take great care that the pencil is *parallel* to the line of the eyes; in measuring vertically, that the pencil does not incline either backward or forward, either to the right or to the left; that it is kept in the same plane, as if against a vertical pane of glass directly in front of the eye.*

As it is necessary that the distance of the pencil from the object should be absolutely the same while studying any one object or group, all

* These are the accepted rules for measurement, and at present they seem the most practical ones. Cylindric, conic and spheric perspective bring up some problems with regard to these rules that are not yet worked out.

measurements should be taken with the shoulders resting firmly against the back of the chair, and the pencil at arm's length; it will be necessary also to take all measurements with one eye closed.



FIG. n.



FIG. o.

Position and Practice by Pupils in Holding the Pencil for Measurement. Sit well back in the chair, with head erect, and shoulders resting firmly against the back of the chair. Grasp the pencil in the middle with the fingers, leaving the thumb, and as occasion demands, the forefinger, free to move along the pencil.

Hold the pencil horizontal and *parallel* to the line of the eyes, at arm's length, with the point to the right. Drop the hand to rest. Hold the pencil vertical (not inclining either backward or forward, either to the right or the left), at arm's length, with the point downward.

Measuring Horizontally. Sit back in the chair, *close one eye*, and hold the pencil horizontal, at arm's length, with the point to the right, and so that the left end appears to be just at the left side of the form or figure to be measured; move the thumb until it appears to be just at the right side (Figure n).

Measuring Vertically. Hold the pencil vertical, at arm's length, with the point downward, at such a height that the upper end of the pencil appears to be exactly on a line with the upper side of the form or figure to be measured; move the thumb up or down the pencil until the thumb appears to be on a line with the lower side of the form or figure (Figure o).

Comparing Two Measurements.—Remember always to take the *same* position (back in the chair, pencil at arm's length) for any two

measurements that you wish to compare; *that these measurements give proportion only, not size.* Take the shorter measurement on the pencil, keep it by holding the thumb fixed; turn the pencil and compare this measurement with the longer, by seeing how many times the shorter measurement can be repeated in the longer. Decide carefully upon the proportion between the two measurements.

As a preliminary to the exercises in Representation, this practice can be given in measurement on the pencil. It is not intended, however, that in the early exercises the objects shall be studied by measurement on the pencil, as it is desired to lead the pupils to see approximately the appearance of objects without this aid. It would be well to call for judgment by the eye first, then measurement on the pencil. And even when measurements on the pencil are made, it must be remembered that they are of assistance only in determining general proportion. It is almost impossible to secure absolutely correct measurements by such means; the eye must always be the final test.

Study of Direction of Edges.—In order to study the direction of a horizontal edge, hold a pencil horizontal and *parallel* to the line of the eyes, at arm's length, with the point to the right. Raise or lower the pencil as the edge to be observed may be higher or lower; but keep it always horizontal and *parallel* to the line of the eyes. Compare the direction of the edge observed with that of the pencil. The observation, by this means, of the upper edge of a door or of a window-blind, open and shut, brings out admirably the difference in apparent direction. Notice the illustration in the upper right corner of the drawing-book page.

Let pupils have as much practice as time will allow in measuring proportions and making quick outline sketches of books, models, etc., in different positions.

Page 5. REPRESENTATION.— Angular Objects.

Lead pupils to observe the way in which parallel edges receding from the observer *appear* to lead, according as they are above or below the level of the eye. They will readily discover that the side edges of the school-

desks in front of them appear to slant upward, but that the upper edge of an open door appears to slant downwards.

A horizontal face when above or below the eye always appears foreshortened.

The farther of two edges horizontal from left to right appears shorter than the nearer.

All parallel horizontal edges receding from the eye appear to converge.

All receding horizontal edges appear to incline toward the level of the eye.

The farther of two vertical edges appears shorter than the nearer.

Give as much practice as time will allow, both for observation and for quick sketches, telling what has been observed.

Page 6. REPRESENTATION.—Grouping.

Let this exercise recall to pupils' minds what they have learned through their recent study of angular objects and what they had previously learned, by study of cylindric objects, in regard to the foreshortening of circles. Refer to page 30 of this manual for the principal points to be reviewed by observation.

Page 7. REPRESENTATION. Review. Optional.

Each teacher will have in mind certain forms on which pupils need to make additional observations. The illustration on the drawing-book page shows a simple and effective way of indicating shade and shadow, which may be studied or ignored at the teacher's discretion.

Page 8. DECORATION. Space Relations.

If it is preferred to use this page for a surface design, keep the work very simple, trying to have pupils feel that beauty of spacing and of dark and light are much to be preferred to elaboration of pattern. It is often a good plan to draw the same design twice, trying different arrangements of dark and light with the same outlines. Use pencil or brush and ink. A good opportunity is afforded for work in color.

Page 9. DECORATION. Space Relations. Dark and Light.

Flower and leaf forms can always be profitably studied for ideas to be used in designs of this sort. The work should be individual, not dictated nor copied.

Page 10. DECORATION. Examples for Study.

Figures 1 to 5 should be very carefully studied for their beautiful space relations and for their grace of curvature in the lines used. The Greeks were masters of line. Much of their beautiful decorative design was executed with the brush on vases, tiles, and other pieces of pottery. Figure 5 is reproduced from a mediæval manuscript.

Figures 6 to 10 show beautiful decorative effects produced by their line division of spaces and their arrangement of light and dark.

Page 11. DECORATION. Optional Lesson.

This is an excellent opportunity for work with brush and ink.

Original designs should be carefully thought out, experiments being made on practice paper. Satisfactory designs should then be repeated in the book.

Page 12. REPRESENTATION.—Pose Drawing.

It is sometimes thought well, after studying the illustration in the drawing-book very thoughtfully, for the pupils to copy it upon practice paper, considering only the entire mass, and rendering the figure in silhouette with ink. This would be a good preparation for the study from life to be placed upon the drawing-book page, as they would by necessity be led away from small details in trying to see the truths of action, mass, and proportion. It would help them to discriminate between essentials and non-essentials, so that later, when the drawing in the book is made, the pupils would not put in meaningless lines. A well-proportioned silhouette, full of action and life, makes a very effective drawing.

The "old-time" silhouette was usually only the head and shoulders cut from black paper, mounted upon white. It was in vogue before the days of photography, and some of the likenesses cut in such a way were very remarkable.

The leading lines of a figure once obtained, the proportions are easily found, and also their relation to each other.

Babies are all curves, with little or no neck, wrists, or ankles; later the relation and proportion of the parts change, and curves modify. The head is much larger, in proportion to the whole figure, in the child than in the adult. Sometimes illustrators overlook this fact, and children are drawn so as to look like little old men and women. A common fault, also, is that of drawing the hands and feet too small, with the curves too round and smooth, and showing no underlying bony structure nor suggestion of muscles.

Encourage the pupils to make mental notes, as well as pencil sketches, of the leading lines of some characteristic figure, and to try later to produce it from memory. A street or steam car may furnish interesting motives. A baseball or a football game gives an excellent opportunity to study action and to observe the leading lines of the figure in different positions. The pupils will see that such violent action is dependent upon the angles the limbs make. A small sketch-book or a pad of paper suitable for pencil work will prove valuable as a help to memory work, and as a means to secure still more thoughtful and careful study of the figure than the time in the schoolroom allows.

Page 13. REPRESENTATION.—Imaginative Drawing.

The opportunity for free, individual work will bring out the pupil's special interest and ability. It should also make it evident to himself and to the teacher where he needs to give more thought to his observation of this or that form, more care to his arrangement or composition of the picture.

If the pupils have made any home sketches from the pose, these may be worked up for this exercise.

Page 14. CONSTRUCTION.—View Drawing.

Review pupils' knowledge of view drawings and what these actually express. See page 45 of this manual and also the inside of the cover pages of the drawing-book.

The views of two models combined demand careful thought, but should be within the

power of the class. Each pupil should have two models to group and study. Let the first drawing be made on practice paper, its size and the arrangement of its parts being carefully thought out

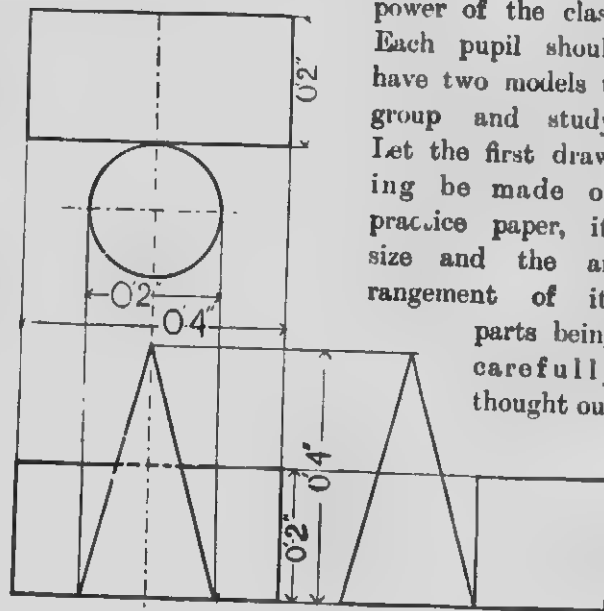


FIG. p

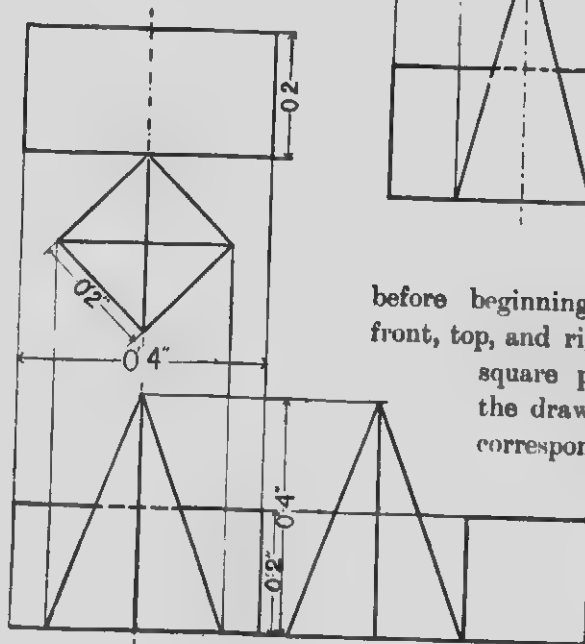


FIG. q.

before beginning to draw. Figure *p* shows front, top, and right side views of the cone and square prism, placed as suggested on the drawing-book page. Figure *q* shows corresponding views of the combination of a square pyramid with a square prism.

If it is preferred to make this an exercise in pattern drawing, have pupils study

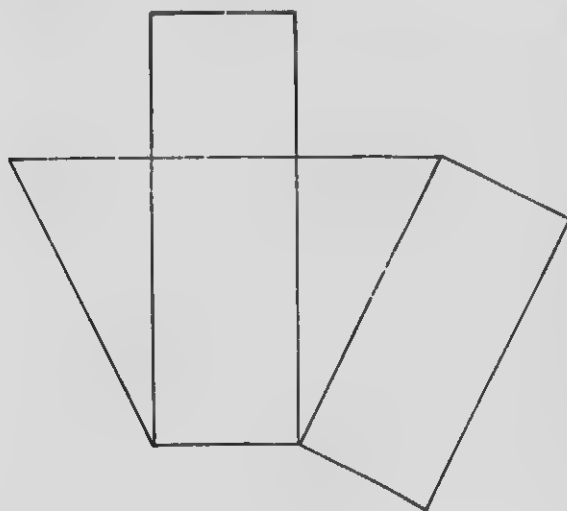


FIG. 1.

the views of the block marked *A* on page 15 of the drawing-book and think out the way to draw the pattern.

Let them make experimental drawings, freehand, on practice paper, cut them out and fold them to "prove" their idea; then, when the general thought appears to be right, make the drawing accurately with a ruler. Figure 1 shows one way of solving the problem. Several ways are possible.

Page 15. CONSTRUCTION. Working Drawings.

A on the drawing-book page is a wedge-shaped block. *B* is a bowl or basin such as might be made of tin. *C* is a pail with a handle.

If possible, borrow simple working drawings from practical workshops, for the pupils to read and explain.

The drinking-cup made up from the pattern page might be used as a subject for a working drawing.

A plain wooden table, a workbox, a footstool, a simple bookcase, would be good subjects for further study in this direction. Draw to scale, using a ruler and keeping proportionate dimensions accurate.

Page 16. CONSTRUCTION. Working Drawings.

Keep in mind the "conventions" for visible and invisible edges, centre line, connecting lines, etc. See the inside of the drawing-book cover. Ask for accurate work done to scale.

Page 17. CONSTRUCTION.—Optional.

Wooden joints or pieces of builders' hardware, *e.g.*, hinges, bolts, etc., make good subjects for study. A practical carpenter could furnish interesting material for a class lesson.

Page 18. REPRESENTATION.—Grouping.

Books are always available in the schoolroom, and interesting groups can be made with them. They should be arranged at an angle and slightly below the eye. The pupil should study to find the best point of view. Avoid an arrangement exactly like the illustration on the drawing-book page.

Hold the pencil from time to time between the eye and the group in order to see more clearly the direction of the converging lines. It would be desirable to render in outline, accenting those parts that are nearest the eye or that seem to call for emphasis. Any details upon the back or sides of the books should be merely suggested, and the group should not be near enough to the eye for lettering or ornament to be distinctly legible or definite. A few suggestive touches for such details where the pupil feels that they should be placed will be sufficient.

Lead the pupils to observe carefully the covers of books, and to notice that they project beyond the leaves. Unless a book is very old and loose in the binding, the corners of the upper cover will be directly opposite those of the lower cover at whatever angle the book may be placed. An open book resting against other books makes an interesting group. Be careful that the books are not placed too far below the eye and that the pupils do not sit so near as to see too much detail.

Page 19. REPRESENTATION. Grouping. Rendering.

See Exercise III. for suggestions.

Page 20. REPRESENTATION.—Flowers from Nature.

The difference between botanical study of a plant, its pictorial study, and its decorative treatment is explained on pages 24-26 of this manual.

Page 21. REPRESENTATION.—Optional Lesson from Nature.

What is true of the pictorial, decorative and scientific expression of plant forms is true also of the forms of birds and animals. Book-covers, jewelry, metal work, wood carving, etc., often furnish interesting examples of the decorative use of subjects taken from the animal kingdom. Encourage pupils to look for such examples.

Let pupils study some pet bird or animal, and make either a pictorial sketch or a composition for a panel. Plant study may be substituted if preferred.

Page 22. REPRESENTATION.—Study of Trees.

It is excellent practice to draw trees in the mass first, in order to get their general form correctly without unimportant details. See what is said on page 57 of this manual about drawing figures in silhouette for the same purpose. Use pencil or brush and ink.

Page 23. REPRESENTATION.—Space Relations in Landscape

The purpose is to produce a beautiful arrangement of spaces appropriate to the particular outlines chosen. If desired, the compositions may be finished in light and dark, making flat tones, and using not more than three—white, gray and black, if ink is used; white, dark gray and light gray if the pencil is used. A good opportunity is given for color.

The exercise suggested as an alternative is an excellent device for studying pictorial composition by masters.

Page 24. PICTURE STUDY.

See the general suggestions regarding Picture Study on page 28 of this manual. Pupils should be led to see that the quality of a picture depends on two elements,—the “story” and sentiment on the one hand, and the

composition on the other hand. The best pictures not only express some interesting thought about the world or its people and their experiences, but also give us something intrinsically beautiful in their lines and forms, masses of light and dark and color.

Henri Lerolle is a French artist of to-day. His pictures are very carefully composed. The original of the print in the drawing-book is a painting in the gallery of the Luxembourg at Paris. It is sometimes called "Dans la Campagne" (*In the Country*).

The effect of distance is beautifully shown in this picture. The strong, dark masses of the nearer tree-trunks have much to do with this effect, making the delicate, hazy drawing of the field seem more vague by contrast with their own decided accent. The tree-trunks divide the picture-space pleasantly for the eye. They also carry the thought up in the direction of their growth, and suggest to the imagination great spaces of open sky overhead. The lights and shadows on the nearest sheep show the woolly texture of its coat. A beautiful life-like effect is given to the browsing animals by means of slight variations in their outlines which are *almost* alike; the forward-reaching necks differ just enough in direction to give us a feeling of motion in the individuals as we look first at one and then at another.

The dignified, womanly figure of the shepherdess moves tall and serene against the background, with an unobtrusive but beautiful halo effect about its dark outline. This exquisite effect of light is often to be seen in real life, but comparatively few people notice it and fewer still have ever put it in a picture.

Do not tell all this to the pupils, but let them discover it for themselves if possible.

Refer to what is said on page 50 of this manual about the composition of flower-drawings, and study the examples given on the drawing-book page. The Japanese are recognized masters of space-composition, and art students eagerly study their work in order to appreciate better the difference between ugly, awkward spacing and that which gives delight to the eye. In studying such examples it is often a good plan to hold them so far away from the eyes that the subject is not clearly identified in itself, and look merely at the blots of dark and light as one might look at the blotches of color in a maple leaf.

BOOK V.

The Pattern Page.—The printed pattern of the square pyramid will be found useful for reference in connection with the work of the drawing-book, pages 15-17.

Page 1. REPRESENTATION.—Nature Study.

Observe the parrot in the illustration on the drawing-book page, and see how his bill differs from a canary's or a hen's.

The sketch of the parrot is meant to give pupils points about simple and effective ways of expressing both form and the texture of plumage. The legs of this parrot were not slender and wiry like a canary's, but shaggy with down like the legs of some breeds of domestic poultry. It is impracticable to try to show fine subdivisions of feathers in such a pencil sketch. What the artist did here was to indicate where the most striking feathers grew and how they slanted or curved, suggesting their feathery look by the use of a very "open" line. This line, by letting the white paper show through here and there, suggests to the imagination the way in which the light shows through the fine interstices of the feathers and so helps make the effect life-like.

Notice how a suggestion of color (dark body, lighter wings) is put into the pencil sketches of insects.

Page 2. REPRESENTATION.—Cylindric and Conic Objects. Principles of Perspective.

The subject of perspective should now be carefully reviewed, that pupils may have a definite grasp of its leading principles.

Nearly all the principles in this subject can be gained from the study of the appearance of type forms, the simplest geometric solids. These type forms may be broadly classified as:—

1. Cylindric forms.
2. Angular forms.

By observations of such forms, pupils may be led to see, and to express orally and by drawing:—

1. That a circle seen obliquely always appears like an ellipse.
2. That the more obliquely the circle is seen, the more nearly the ellipse approaches a straight line.



FIG. 8.

3. That the less obliquely the circle is seen, the more nearly the ellipse approaches a circle.
4. That a horizontal face, when above or below the eye, always appears foreshortened.

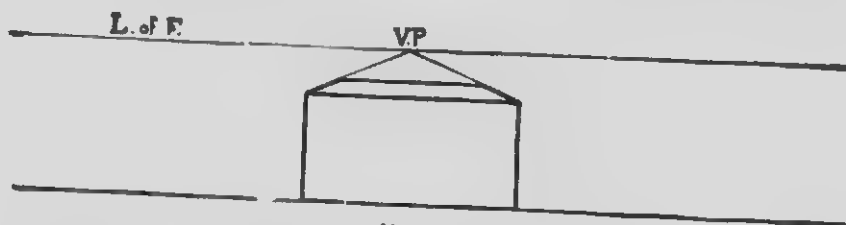


FIG. 11.

5. That the farther of two edges, horizontal from left to right, appears shorter than the nearer.

6. That all parallel horizontal edges, receding from the eye, appear to converge.
7. That all receding horizontal edges appear to incline toward the level of the eye, and must be so drawn.
8. That all parallel horizontal edges receding from the eye appear to converge to a point on the level of the eye, and must be drawn so that, if produced, they will meet in a point on the level of the eye (L. of E).
9. That parallel horizontal edges receding to the left appear to converge to a point on the level of the eye at the left of the object; those receding to the right appear to converge to the right of the object. These points are called respectively Vanishing Point 1 (V. P. 1) and Vanishing Point 2 (V. P. 2).

FIG. t².

10. That for rectangular objects standing with side faces turned equally away, the vanishing points are equidistant from the object.
11. That the farther vertical edges appear shorter than the nearer, and should be so drawn.
12. That for rectangular objects standing with side faces turned unequally away, V. P. 1 and V. P. 2 are unequally distant from the object, according to the angle at which the object stands.

FIG. t³.

The illustrations of the appearance of the group of objects (Fig. 8) and of the square prism below the level of the eye (Fig. 1¹) exemplify principles 1-8. The illustrations given of the cube turned and below the level of the eye (Fig. 1² and Fig. 1³) are an exemplification of principles 6-11. These principles can also be confirmed and impressed by the study of angular objects above the eye. The illustrations of these principles are made from models, as the exact forms of the models show the application of these principles more clearly than irregular objects would do. Pupils will deduce the essential laws of the change in the appearance of objects in different positions, from their own observation.

Page 3. REPRESENTATION. Grouping. Light and Shade.

Refer to pages 14-16 of this manual for suggestions in regard to the arrangement and drawing of groups of objects. The illustration on the drawing-book page shows how the pencil can give beautiful effects of color. It also shows good expression of observed effects of light and shade.

The following suggestions will aid the teacher in directing pupils' study of light and shade:—

Look at any object placed in the light; the part toward the light is of a different tone from the part away from the light, and the object casts a shadow. We have, then, **light** on the part toward the light, **shade** on the part away from the light, and the **shadow** cast by the object—three distinct conditions as regards the light. These conditions, generally included under the term **light and shade**, are to be studied in this exercise.

When the light comes but from one part of the room, the *light* on the object is strong, the *shade* and *shadow* are well defined. If light comes from two or more directions, there will be cross lights, which will cause perhaps two or three shadows—angling with each other, and render the *lights* of shade and shadow vague. In any elementary study of light and shade, therefore, the light should be arranged as far as possible to fall in one direction.

The best effects can be obtained in a schoolroom where the light comes in from the left side alone. If the room is lighted from one side and the back, shut off the light from the back and from all but one or two windows

at the side. If the lower part of these windows can be screened, it will be better. In the case of cross lights, only the strongest shades and shadows should be studied.

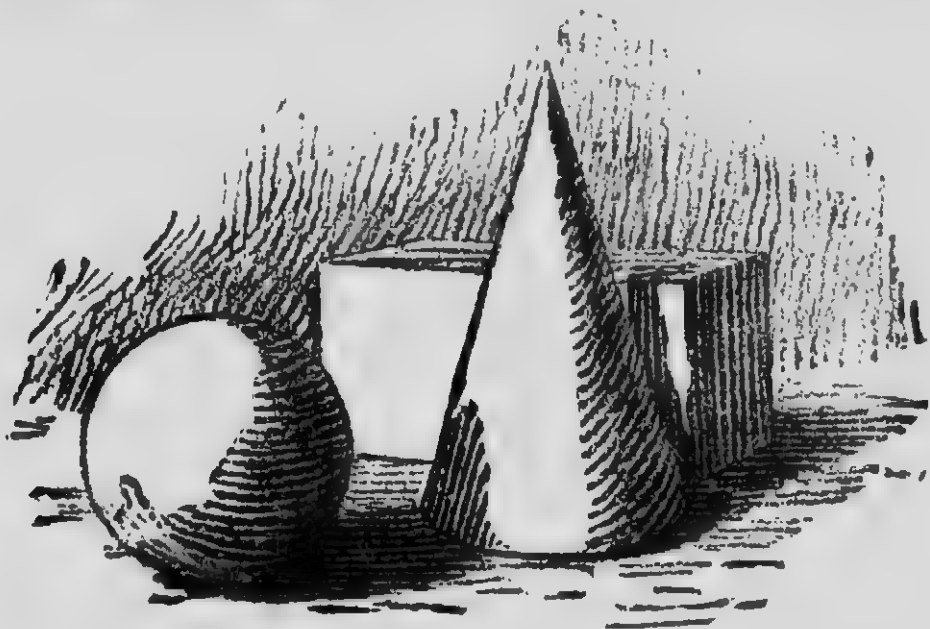


FIG. II.

See Figure II, where simple effects of shade and cast shadows are expressed by parallel pencil lines, vertical, horizontal, oblique, curved, as the case may be. The curvature or the direction of a shaded or shadowed surface may be indicated by the direction of the shade and shadow lines, straight lines being used for plane faces and curved lines for rounding faces. When a shadow falls upon a horizontal surface it is expressed by horizontal lines, and that if a part of the same shadow falls upon a vertical face or surface, the lines expressing the shadow are vertical. These suggestions as to direction of line must not, however, be considered as absolute or prescriptive.

The strengthening of the outline away from the light, that is practised in outline drawing, is omitted in light and shade drawing.

When a picture is worked up toward full values, there will appear *foreground, middle distance, background*. These may be carried out even in a simple group the principal object being in the foreground, the secondary objects being in middle distance, the background being added, as in the illustration on the drawing-book page. In rendering, the foreground should have the stronger, clearer touches, the middle distance the more subdued touches, and the background should be entirely subordinate, fainter, and less defined than any other part of the picture.

Page 4. REPRESENTATION.—Angular Objects. Principles of Perspective.

See the notes on the perspective of angular objects, page 66 of this manual.

Page 5. REPRESENTATION.—Angular Objects. Principles of Perspective.

In drawing a pyramidal object above the level of the eye, it is sometimes found difficult to make it look properly vertical. The problem is simplified by knowing that the apex of such a pyramid is always exactly above the centre of the (square) base. The centre of the appearance of a square (no matter how much foreshortened that is) can always be found at the point where its diagonals cross. The illustration in the upper left corner of the drawing-book page shows an outline sketch of the pyramidal roof of a tower, with light skeleton lines drawn to find the centre of the pyramid's base and the correct location of its apex on the vertical rising from that centre.

Page 6. REPRESENTATION.—Grouping. Rendering.

Recall what has been learned in recent lessons regarding perspective principles and rendering in light and shade.

The illustration in the drawing-book expresses color, in a simple but effective way.

Page 7. REPRESENTATION. Review. Optional.

Encourage out-of-school sketching by pupils who are interested in attempting it. The perspective principles already learned should be borne in mind. Pupils should criticize their own drawings as far as possible, always making for themselves whatever corrections are needed.

Page 8. DECORATION. Space Relations.

It adds interest and makes possible more intelligent work, if a design is understood to have a definite application; thus, the design for a panelled door might have reference to the entrance of a schoolhouse, church, or library, the door of a book-case, a cabinet for *curios*, a china closet, etc., as the case may be. These differences of purpose would naturally call for designs differing more or less in character, though each scheme of space division may be good in its own way.

Page 9. DECORATION. Space Relations. Dark and Light.

First draw several squares on practice paper, and in these make experiments in space division. It is a good plan to duplicate the most satisfactory squares, and try two different schemes of dark and light to see which is more pleasing to the eye. It is only through such thoughtful experiment and comparison that pupils' feeling for beauty will make the growth desired.

Page 10. DECORATION.—Examples for Study.

Figure 1 is an excellent example of Byzantine ornament as practised in church decoration in the sixth century. It is from the cathedral of Santa Sophia in Constantinople. The general idea of the repeated figure was borrowed from the ancient Greek anthemion (Figure 4). Notice especially the exquisite curvature of the lines in Figure 1. It is considered one of the most beautifully designed figures ever made.

Figures 2, 3, 5, 6 are also reproduced from the ancient Greek.

Figure 7 is from an old Gothic church enriched, as such churches always were, with ornament carved in stone.

The remaining designs are for tiles and textiles. Study all for their beauty of space division and of relations of dark and light.

Page 11. DECORATION. Optional Lesson.

If a border is chosen for reproduction, it should be made at least three inches wide, and carried across the page. The border designs given would be especially effective if they could be finished with brush and ink.

If a surface design is to be made, use practice paper for first experiments. Study the examples on page 10 to see how simple pencil work may suggest the use of two different color values.

Page 12. REPRESENTATION.- Pose Drawing

If pupils are sufficiently well grounded to attempt drawing the face, let them indicate features in a broad, suggestive way, as on the drawing book page, without trying to put in small details.

Lead them to study proportions with great care the proportion of width to height; of single features to the whole head.

Encourage all the home sketching which pupils will do observantly and thoughtfully.

Page 13. REPRESENTATION Imaginative Drawing.

Encourage the free expression of pupils' individuality in this exercise.

Page 14. CONSTRUCTION. Floor Plans.

The illustrations on the drawing book page include a camper's tent and its floor-plan.

Ask pupils for an accurately drawn floor-plan of the schoolroom. Desks may be indicated by oblongs, chairs by squares behind them. See what is said on the inside cover page of the drawing book about working to scale.

Encourage home work in the same direction, making floor-plans of house rooms, stables, shops, etc. All such plans should be distinctly marked to show the section on which they are drawn, that they may give accurate information about dimensions as well as about forms and proportions.

Page 15. CONSTRUCTION.—Geometric Problems.

Facility in making freehand sketches for working drawings is essential for every draughtsman who makes drawings for constructive purposes. In many cases a freehand drawing is all that is needed. In other words, it is frequently necessary to make rapid drawings, freehand, in shops or other places where instruments cannot be made available, the careful instrumental drawing being made when more time is at command, and in a place where instruments can profitably be used. Make these points clear to pupils before beginning the use of instruments.

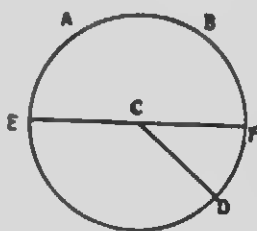
The use of the instruments—compasses and rule—should be carefully taught and drilled upon at the start. Pencils used in instrumental work should be harder than those used in freehand work. Learning to keep the hard pencil well sharpened, to hold it erect when making points or ruling lines, and to use it either lightly or more firmly, is an important part of the first steps in this work. Learning to handle the rule deftly and noiselessly, to lift it as little as possible, to take as many measures as convenient without moving it, to measure by it with precision, and to avoid using the "end inch," is important in order to secure rapid, thoughtful, and accurate work.

Before attempting any work with compasses, the class should be made somewhat familiar with their appearance and use in the hand of a teacher. Compasses are used to describe circles and arcs, and to set off distances. They have a head and two legs. In describing a circle or an arc, the compasses are held by the head, the point of one leg is fixed, the compasses are turned, and the point of the other leg describes a circle about the fixed point. It is, of course, essential that the distance between the two points shall remain the same while the circle is being described. A way to hold the compasses without changing the angle between the legs must be found.

Practice pupils in simply taking hold of the compasses properly. Be sure that every pupil has the right grasp. Time spent in this practice, when the compasses are first put into the hands of pupils, will be time saved in the end.

In describing the circle, there should be a slight (and but a slight) pressure on the fixed point, to keep it in place. The compasses should be so placed that the pencil point will be at the left of and below the centre; that is, so that a line connecting the points would be at about an angle of 45° to a horizontal line. Then the head is rolled between the thumb and fingers on the ball of the thumb, the first finger gradually taking the place of the second, until finally the circle is fully described. This movement should be carefully studied and practised until a circle can be drawn with one sweep of the instrument.

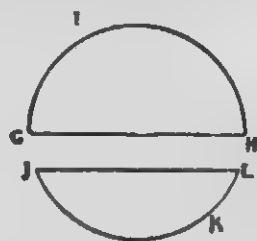
The figure ABFDE is a *circle*—a plane figure bounded by a curved line called a *circumference*, every point of which is equally distant from a point within,



called the *centre*. Any line, as CD, passing from the centre to the circumference, is called a *radius*—the plural form is *radii*.

A line, as EF, passing through the centre of the circle and terminating in the circumference, is called a *diameter*. Half a

circle, as GHI, is called a *semi-*



circle. Any part of a circumference, as JKL, is called an *arc*; a line connecting the extremities of the arc, as JL, is called a *chord*.

While practising the use of the compasses, geometric terms may be recalled. When the metal point of the compasses is fixed on the paper, for the purpose of describing a circle or an arc, the point where it is fixed is said to be taken as a centre. The distance between the metal point and the pencil point is then called a radius. "Take any radius," means open the compasses more or less. "Take a radius of 1" (one inch), means open the compasses so that the distance between the points is 1". This will give practice in taking measures from the rule with the compasses, which should be held perpendicular to the rule. "Take any point as a centre," means

fix the metal point on the paper or board. "Take C as a centre," means fix the metal point at the point marked C. Having explained these phrases, let pupils practise describing single circles and concentric circles on practice paper. Limit them somewhat as to centre and radius.

Geometry is the basis of accurate instrumental drawing. The drawing-board and T-square, used by mechanical draughtsmen, give a short cut to accuracy, and in many schools they are used by the pupils. An understanding of geometric principles is nevertheless necessary, and the study of geometric problems is of great disciplinary value.

The main effort should be to fix the geometric laws and the relation between problems. For example, the axiom "two points of a line determine its direction," is at the root of all the relation of parallels. Children do not always see parallels. Indeed, they seldom notice parallels that are out of the more ordinary positions until trained to observe them. In teaching Problem 1, care should be taken that this law shall become general in its application, so that the pupils will be able to use it under all possible conditions.

Another law governs all bisection, whether of line, arc, or angle, and this law should become the possession of the pupils.

As for relations, the equilateral triangle is found in the hexagon, and is easily made in the trisected semicircle, while both the equilateral triangle and the trisected semicircle go into the making of the regular hexagon.

In teaching geometric problems, while dictation must necessarily be used, the work should not stop with dictation, but the pupils should be led to realize the truths worked out under dictation, and to relate these truths.

The following geometric problems give an excellent basis for instrumental work in Construction.

Problem 1. *To draw a line parallel to a given line.*

Problem 2. *To bisect a line, or to draw a line perpendicular to it at its centre.*

Problem 3. *To bisect an arc.*

Problem 4. *To bisect an angle.*

Problem 5. *To construct an equilateral triangle on a given base.*

Problem 6. *To trisect a semicircle.*

Problem 7.—*To draw a regular hexagon.*

Problem 8.—*To draw a regular hexagon on a given base.*

Problem 9.—*To draw a perpendicular at the end of a given line.*

Problem 10.—*To construct angles of 90° and 45° at a point upon a given line.*

Problem 11.—*To construct angles of 60° and 30° at a point upon a given line.*

Method of Development.—Exercises in the development of some of these problems are given as suggestions to the teacher of good methods, by which pupils can be led to think out their solution.

Problem 1.—Begin the work by giving the following dictation exercise. The questions and answers are merely suggestive; take your own method of leading the pupils to discover the process.

Dictation. 1.—Draw a horizontal line 5 inches long, marking the ends A and B. With a radius of 1 inch and A as a centre describe an arc intersecting the line at the right of A, and mark that point C. With C as a centre, and radius CA, describe a semicircle on the line AB. With the right end of the curve just drawn, as a centre, and the same radius, describe a second semicircle. In the same way describe a third and a fourth semicircle successively on the line AB. Rule a line tangential to, or touching, the highest points in the four semicircles. Number this line 1 2. The letters and figures refer to the illustrations below.

Ask pupils now to lay their instruments back on their desks, and study the drawing which they have just made. Ask

How does the line 1 2 compare in direction with the line AB?—The line 1 2 is parallel to the line AB.

When is one line parallel to another?—When the lines are the same distance apart throughout their entire length.

Prove that 1 2 and AB are the same distance apart throughout their entire length.

The same radius was taken for all the semicircles, and the line 1 2 just touches the highest point in each semicircle.

Good. Now how can you draw a line parallel to DE?—By drawing on DE, as we did on AB, four semicircles with the same radius, and then drawing a line tangential to them.

Now think ; cannot a line be drawn parallel to DE with less work?—Yes ; with only one semicircle at each end.

Come to the board and do it. Now, can this be done with any less work?—Yes ; by drawing just the top of each of the two semicircles.

Right. What is a part of a circumference called?—An arc.

Now I think you can tell me about drawing a line parallel to DE. How many arcs will be necessary?—Two.

Where must their centres be?—On the line DE, near the ends.

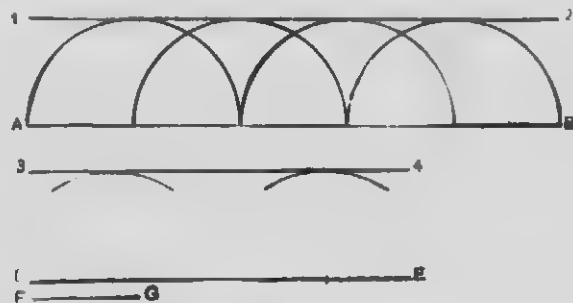
Where must the arcs be drawn?—Above the centres.

How long must the arcs be?—Long enough to show plainly the highest points.

What radius?—A radius equal to the required distance between the lines.

Here is a line, DE, on the board, and here is a shorter line, FG. Come to the board, and draw a line parallel to DE, at a distance FG.

2. Draw a line parallel to DE, at a distance FG. Make the arcs fine and light. The letters refer to the illustration below.

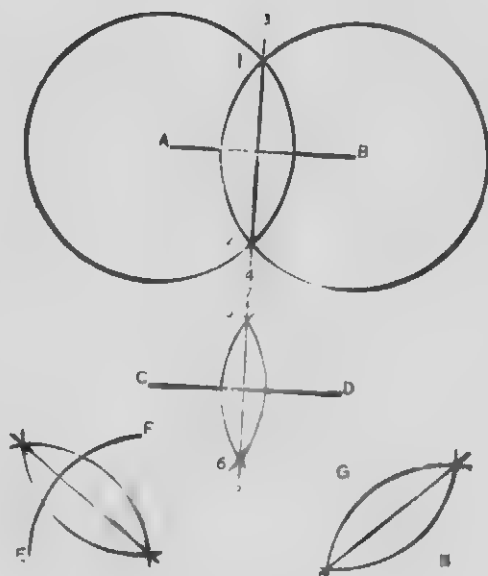


When the work is completed, the pupils should be led to state the problem, and the manner of working it, as follows.

PROBLEM 1.—*To draw a line parallel to a given line.*

Let DE be the given line. Take any two points in the line DE, near the ends, as centres, and, with a radius equal to the required distance between the lines, describe two arcs above the centres. Draw a line 3 4 tangential to, or touching, the arcs. 3 4 will be the required line.

Problem 2—Do not state to the pupils the object of this exercise, but give the following dictation.



Dictation.—With A as centre, and a radius greater than half of AB, describe a circle. With B as centre, and the same radius, describe a circle intersecting the first. Mark the points of intersection 1 and 2. Rule a line, 3, 4, through 1 and 2.

Ask pupils now to lay their instruments back on the desks, and study their drawing. Ask

How does the line 3 4 divide the line AB?—In the centre. The line 3 4 bisects the line AB.

How does the line 3 4 compare in direction with the line AB?

The line is perpendicular to AB.

The line 3 4 is perpendicular to AB at what point?—At the centre of AB.

Here is a line, AB, on the board. Come and bisect it. How did you do it?—By drawing two circles and a line to connect the points of intersection.

Who can do it with less work? Come and do it. How have you done it?—Instead of whole circles, I drew arcs long enough to intersect above and below the line.

This line, AB, on the board is bisected. Here is another line, CD. Who can draw a line perpendicular to CD at its centre? Come and do it. How many arcs will be necessary?—Two. How long must they be?—Long enough to intersect above and below the line.

What centres must be taken?—The ends of the line.

What radius must be taken for the first arc?—A radius greater than half the line.

What radius for the second arc?—The same as for the first.

When this work is completed, ask the pupils to state the problem and the manner of working it as follows:—

PROBLEM 2.—To bisect a line, or to draw a line perpendicular to it at its centre.

Let CD be the given line. With a radius greater than half the line, and the points C and D as centres, describe, with the same radius, arcs intersecting each other above and below the line CD, in points 5 and 6. Draw

a line, 7 8, through points 5 and 6. The line 7 8 bisects the line CD, and is also perpendicular to the line CD at its centre.

Problem 3.—In a similar manner, lead to a statement of Problem 3.

PROBLEM 3.—*To bisect an arc.*

Let EF be the given arc. With a radius greater than half the distance from E to F, and the points E and F as centres, describe arcs intersecting each other above and below the arc EF. A line through these points of intersection bisects the arc.

Problem 4 The following dictation illustrates the application of preceding problems in the development of Problem 4. The resulting figure should be like the illustration below.

Dictation.—Draw a horizontal line $2\frac{1}{2}$ " in length and mark the ends GH. Bisect GH by Problem 2, and mark the centre I. With I as a centre, and the radius GI, describe a circle.

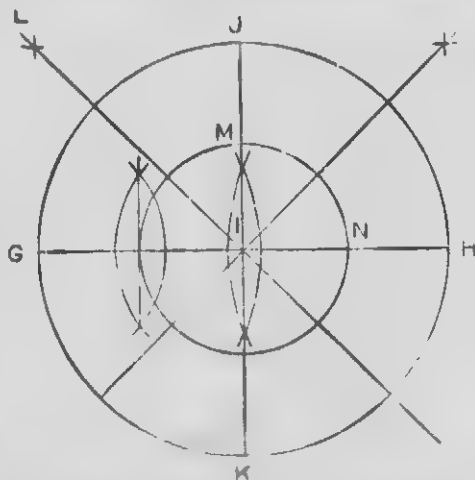
Draw the vertical diameter of the circle by continuing the line of bisection each way to meet the circumference. Mark this vertical diameter JK. Draw an oblique diameter which shall bisect two diametrically opposite quarter circles or quadrants. How can this be done? By bisecting the arcs GJ and JH. With G and J as centres, and a radius greater than GJ, draw arcs intersecting in L. Draw a line from L through I to the opposite part of the circumference. Bisect GI. With I as a centre, and a radius equal to half of GI, describe a circle.

Study the figure as in the preceding problem

What is the angle GJI? An angle of 90° because it is a quarter circle.

How does the line LI divide it? It bisects it.

How did you get L?—By taking the ends of the arc GJ as centres and describing intersecting arcs.



What is the angle JIH?—An angle of 90° . (The points where the small circle intersects the lines JI and HI may be marked MN.)

What is the angle MIN?—An angle of 90° . Bisect it as in the case of GIL and extend the line of bisection through to the circumference so as to give another oblique diameter of the large circle.

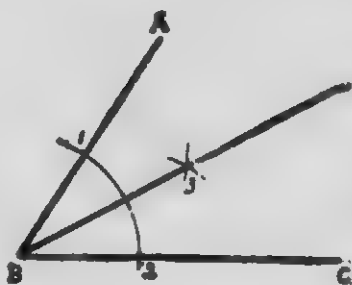
How does this line divide the angle HIJ?—It bisects it.

It will be seen that this work leads the pupils directly to the bisection of an angle. In giving this work, try to have pupils discover for themselves the relation between the different problems, and to feel that bisection in all cases rests on the same principles.

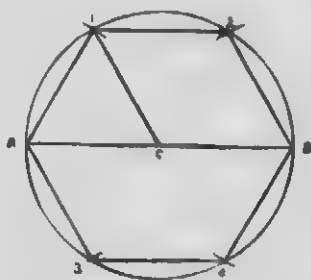
Let the previous work lead to the following statement of—

PROBLEM 4.—*To bisect an angle.*

Let ABC be a given angle to be bisected. With B as centre, and any radius less than BC, draw an arc intersecting AB and BC at 1 2. With 1 and 2 as centres, and the same radius, draw arcs intersecting at 3. Draw B 3. This line will bisect the angle ABC.



Problems 5, 6, 7, 8.—Do not state the object of the exercise, but begin the work by giving the following dictation:



Dictation.—With any desired radius describe a circle, and mark its centre C. Draw its horizontal diameter, AB. With AC as a radius and A and B as centres, construct arcs intersecting the circumference at 1, 2, 3, and 4. Rule lines connecting the adjacent intersecting points. Connect 1 and C.

Ask pupils now to lay their instruments back on their desks, and study the drawing which they have just made. Ask—

What is the figure A 1 C?—A triangle. An equilateral triangle.

What is a triangle?—A figure having three sides.

What is an equilateral triangle?—An equilateral triangle is a triangle having three equal sides.

What is the base of a triangle?—The base of a triangle is the side on which it seems to rest.

What is the base of the triangle 1 AC?—AC.

Can you draw, with the aid of your compasses, an equilateral triangle on a given line, DE, as a base?—Yes; with DE as radius, and D and E as centres, draw quadrants, and rule lines from the point of intersection to D and E.

Come to the board and show how you would do it. Can it be done with less work?—Yes; with the same radius and centres, describe *short arcs* that will intersect above the centre of the line DE, and then rule lines from the point of intersection to D and E.

How is the semicircle A 1 2 B divided?—The semicircle is divided into three equal parts, that is, trisected.

How could you trisect a semicircumference with your compasses?—With the radius of the semicircle as radius, and with each end of the semicircle as centre, describe short arcs cutting the semicircumference.

Does A 3 4 B look like any figure that you have ever seen?—Does it look like a part of any figure that you have ever seen?—It looks like half a hexagon—half the base of a hexagonal prism.

What is a hexagon?—A hexagon is a figure having six sides.

Yes; and when the sides are equal, the hexagon is called a regular hexagon. When they are unequal, the hexagon is called an irregular hexagon. Is A 3 4 B half of a regular hexagon, or of an irregular hexagon?—A 3 4 B is half of a regular hexagon.

How do you know that it is half of a *regular* hexagon?—Because A 3, 3 4 and 4 B are all equal to the radius of the semicircle, and must, therefore, be equal to each other.

How could you complete the hexagon?—By drawing a semicircle above AB, trisecting it by the radius of the semicircle, and connecting the successive points by straight lines.

What would AB then be called?—The diameter of the circle.

Right in regard to the circle. What would it be called in relation to the hexagon?—The diameter.

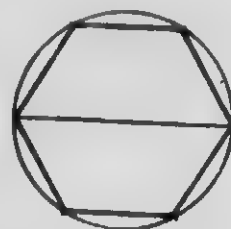
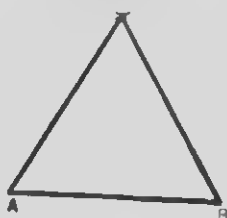
No; a diameter of a rectilinear or straight-line figure connects the centres of opposite sides. What is the line that connects the opposite angles of a square called?—A diagonal.

What does AB connect?—The opposite angles of the hexagon.

It is, then, the diagonal of the hexagon. Look now at your figure and think. How would you draw a regular hexagon with compasses? Take a centre and a radius and draw a circle. Draw a diameter of the circle; with the radius of the circle, and with the ends of the diameter as centres, trisect each semicircle.

From this work there may be deduced the construction of an equilateral triangle, the trisection of a semicircle, and the construction of a hexagon under different conditions.

This work should lead to the following statement of the subjoined problems and the manner of working them:—



PROBLEM 5.—*To draw an equilateral triangle on a given base.*

Let AB be the given base. With AB as radius, and A and B as centres, describe arcs intersecting in point 1. Draw A 1 and B 1. 1 AB will be the required triangle.

PROBLEM 6.—*To trisect a semicircle.*

With the radius of the semicircle as a radius, and the ends of the semicircle as centres, describe short arcs intersecting the semicircle. The semicircle will then be trisected.

PROBLEM 7.—*To draw a regular hexagon.*

With any radius and any point as centre, describe a circle. Draw a diameter of the circle. Trisect the two semicircles. Connect the adjacent points by straight lines. The figure thus drawn will be a regular hexagon.

PROBLEM 8.—*To draw a regular hexagon on a given base.*

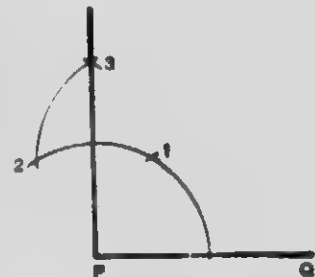
Construct on the given base an equilateral triangle by Problem 3. With the vertex of the triangle as centre, and one of its sides as radius, describe a circle. Complete the hexagon by Problem 5.

The illustration on the drawing-book page shows a good way in which to work out several problems neatly on one sheet or page.

Problems 9, 10, 11 may be also given to pupils.

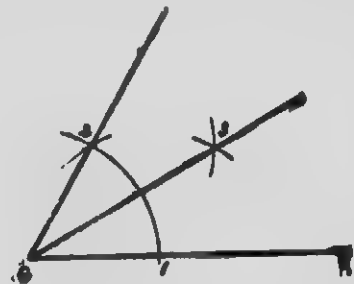
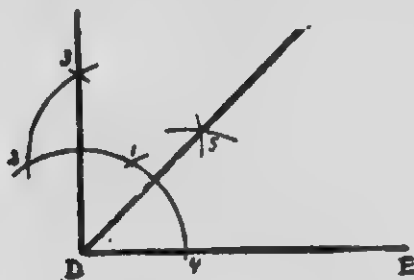
PROBLEM 9.—*To draw a perpendicular at the end of a given line.*

Let PQ be the given line. With P as centre, and any radius, describe about two-thirds of a semicircle, the right end of the arc resting on the line PQ. With the same radius, lay off equal distances on the arc. With 1 and 2 as centres, describe arcs which intersect at 3. Draw 3 P. This will be the required perpendicular.



PROBLEM 10.—*To construct angles of 90° and 45° at a point upon a given line.*

Let DE be the given line; it is required to make at D angles of 90° and 45° . At D erect a perpendicular, 3 D, by Problem 9. This gives the right angle or angle of 90° , 3 DE. Bisect this angle by Problem 4, by the line 5 D. The angles 3 D 5 and 5 DE are each angles of 45° as required.



PROBLEM 11.—*To construct angles of 60° and 30° at a given point upon a given line.*

Let GH be the given line. Angles of 60° and 30° are required at the point G. With G as centre, and any radius less than GH, draw an arc upwards from 1 on GH. Lay off on this from 1 the distance 1 2, equal to G 1. Draw G 2. The angle 2 G 1 is the angle of 60° required. Bisect this by Problem 4, by the line G 3. The angles 3 G 1 and 3 G 2 are angles of 30° as required.

When pupils have mastered these fundamental geometric problems, proceed to:—

The Application of Geometric Problems in Working Drawings and Patterns.—In the views and development of the cone on page 15 of the drawing-book it will be observed that the measurement of the curved edge of the curved face has been determined geometrically. A paper model of a cone which can be unrolled will help the teacher in understanding and explaining this. The pattern of the base of the cone must, of course, be a circle of the same size as the top view. The pattern of the curved face will have one curved and two straight edges. The curved edge is a part of the circumference of a circle, of which the slant height of the cone is the radius. The straight edges will be equal in length to the slant height of the cone. The slant height of the cone may be seen in the oblique lines of the front view. The length of the curved edge must be equal to the circumference of the base, or to the circumference of the top view, which is just the same.

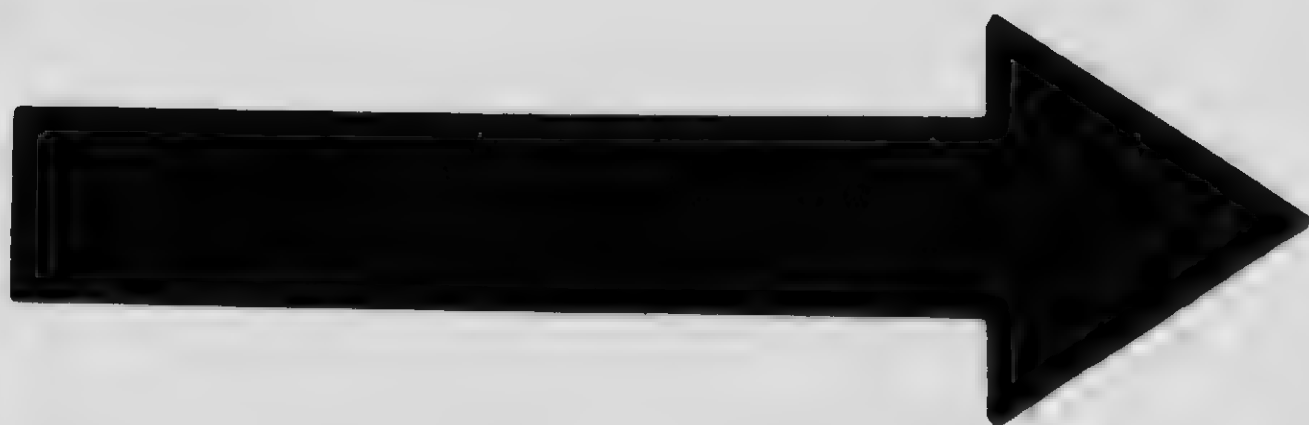
In the illustration the arc ACDEB is half of a circle, of which AB is the diameter, while it forms the chord of the arc. The difference between the chord AB and the arc ACDEB is greater proportionately than the difference between the chord AC and the arc AC. The smaller subdivisions of the arc lessen this difference, as seen at CD and DE; so, to obtain the measurement, the circumference of the top view is divided into sixteenths. These measurements are set off upon the curved edge of the pattern of the curved face, thus fixing the length of the curved edge, and determining the points in the circumference from which the straight lines shall be drawn to the centre.



The Frustum of the Cone. In the development of the frustum it will be seen that there are two curved edges, each being an arc of a circle. The radius of the first or larger one is the slant height of the cone as shown in the front view. The radius of the second is the slant height between the vertex of the cone and the top of the frustum.

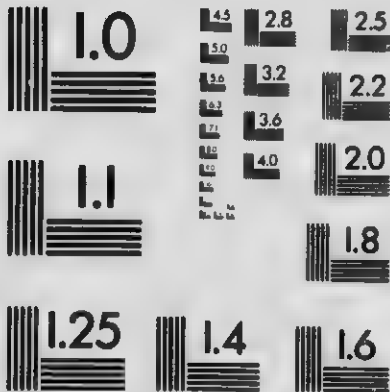
Page 16. CONSTRUCTION. Working Drawings.

Choose fairly simple objects, but require strict accuracy of observation and correctness of drawing.



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Page 17. CONSTRUCTION. Optional.

The illustrations on this page suggest two kinds of exercises which will make new demands on the pupils: the study of type models turned at various angles, and the study of hollow models whose inner form must be stated in the drawing by showing actual or imaginary sections. Sections may be made vertically, horizontally, or obliquely.

Page 18. REPRESENTATION.—Grouping. Rendering.

It may be profitable to copy the example given on the drawing-book page, in order to understand better its special excellences.

Page 19. REPRESENTATION.—Grouping. Rendering.

Previous exercises in the same drawing-book will have prepared the pupil for this. Page 24 of this manual gives suggestions about the rendering of material or "texture."

Page 20. REPRESENTATION.—Flowers from Nature.

See pages 24–26 of this manual for comments on pictorial sketching, botanical study, and decorative treatment of plant forms. If decorative treatment is preferred, it is well to arrange the composition on practice paper. Where brush and ink are available, it is a good plan to try two different arrangements of light and dark, and choose the better for working out on the book page.

Page 21. REPRESENTATION.—Optional Lesson from Nature.

The illustrations of horses and riders on the drawing-book page are famous old examples of the decorative use of animal and human figures. The huntsman is from an ancient Assyrian *bas-relief*, made about 600 years B.C. The horsemen below are from the celebrated frieze of the Athenian temple,

called the Parthenon. The Greek original was sculptured in marble during the fifth century B.C. Parts of the frieze are now in the British Museum, and are known as the Elgin marbles.

Pupils' work for this page may be the making of a pictorial sketch, or, if preferred, a decorative treatment of the subject within an oblong space.

Page 22. REPRESENTATION. - Out-of-Door Sketching.

Let the drawing of the house review the pupils' knowledge of perspective principles studied earlier in the year. Choose a simple house without any intrusive ornament. Indicate masses of trees or shrubbery without trying to show any small details.

If out-of-door sketching is not practicable, let pupils make sketches from photographs or other prints, leaving out all unimportant accessories. Keep the work as simple as the illustrations on the book pages.

Page 23. REPRESENTATION.—Space Relations in Landscape.

Lead the pupils to see that this study of space relations in landscape is, in its own field, akin to the decorative treatment of plant forms and animal forms.

Let experimental work be done on practice paper. If it has not been practicable to make individual out-of-door sketches in preparation for the lesson, use the illustrations in pages 22, 23 of the drawing book for suggestions, or take hints from landscape pictures in other school-books.

Keep the new composition simple, depending for its beauty on good space divisions and beautiful lines.

If desired, pupils may carry the work a step further into the study of light and dark. Let experiments be made on practice paper with brush and ink, if practicable, using black for certain parts, gray for others, and untouched white for the rest. The purpose here is not to obtain a pictorial effect, but to produce a pleasant arrangement of black, white and gray masses in the given space.

Page 24. PICTURE STUDY.

Refer to the suggestions regarding Picture Study for Books 1 to 4 of this series.

All artists make a great many sketches in preparation for their important works. These sketches are sometimes like note-books, the fixing of a memorandum of something which interests them, *e.g.*, a mass of trees and roofs against the sky, the outline of a galloping horse, the figure of a golf-player about to strike a ball. Sometimes the sketches are experiments, made to try the effect of different positions and arrangements of a subject.

The figure-drawing given in the book is reproduced from a chalk-drawing by **Raphael Sanzio** (1483-1520), the great Italian master. It is one of his many studies in preparation for a celebrated painting in a great palace in Rome. The whole picture represents a terrible fire which destroyed a large district of the city centuries ago, and it shows many different groups of people terrified by the calamity. This drawing shows part of a little group of women and children who are praying for help. It is worth very careful study in itself for its spirit and beauty, and any student of drawing can learn much from its simple, masterly rendering.

The architectural illustrations will be found interesting both for the beauty of the ancient buildings and for their historic associations.

The Pantheon is an old Roman building, the body of which was standing before the Christian era. It has been used for different purposes, but was for many years a temple to the heathen gods; now it is a Christian church. It is specially famous as being one of the first successful attempts to build a large roof in the shape of a dome. Its circular walls are nearly a hundred and fifty feet in diameter, and the dome rises to a height of nearly a hundred and fifty feet from the ground. It is lighted by a circular opening in the top of the dome. The pillared porch and the towers are not quite so old as the rest of the building.

Raphael's tomb is in the Pantheon.

The Temple of Theseus is the best preserved example of its kind. It was built over two thousand years ago (465 B.C.) and is still standing in Athens. It is over one hundred feet long. The figure of the man standing by one of the stately columns gives an idea of their height. The Greeks studied proportions in everything they built; and their best architects came to have so exquisite a sense of beauty of proportion that their works which have stood until now are considered masterpieces of artistic construction. We never become tired of them. That is, in effect, what an old Greek historian said about them centuries ago:—

"Every one of those that were finished, seemed then to be very ancient touching the beauty thereof; and yet for the grace and continuance of the same it looketh at this day as if it were but newly done and finished, there is such a certain kind of flourishing freshness in it—as if every one of the aforesaid works had some living spirit in it to make it seem young and fresh."—(*Plutarch.*)

GLOSSARY.

SPHERE: a solid having one round face
—a ball.

HEMISPHERE: half a sphere; a form
having one rounding face and one
plane circular face.

CUBE: a solid having six equal plane
faces, the opposite faces being parallel.

CYLINDER: a solid having two equal
plane circular parallel faces, and one
curved face.

PRISM: a solid having two plane poly-
gonal faces called bases, and between
these as many plane side faces as the
bases have sides. It may rest on either
base.

—, **SQUARE:** one whose bases are
squares. A cube is a square prism,
whose side faces equal its bases in
size and shape.

—, **TRIANGULAR:** one having tri-
angles for bases. A right-angled
triangular prism has right-angled tri-
angles for its bases. An equilateral
triangular prism has equilateral tri-
angles for its bases. An isosceles
triangular prism has isosceles triangles
for its bases.

—, **HEXAGONAL:** one whose bases are
hexagons.

ELLIPSOID: a solid bounded by one regu-
larly rounding face and having three
axes, two of which may be equal; a
solid generated by the revolution of an
ellipse on one of its axes.

OVOID: a symmetric solid having one
rounded face and having one end
larger than the other.

CONE: a solid having one plane circular
face called the base, and one curved
face. The circumference of the curved
face diminishes regularly until it van-
ishes in a point called the vertex.
In a right cone the vertex is directly
over the centre of the base.

PYRAMID: a solid contained by a plane
polygon as base and triangular planes
meeting in a vertex. Pyramids are
named from their bases, as triangular,
square, etc., as the base is a triangle,
square, etc.

SURFACE: the whole outside of a form.

FACE: a part of a surface unbroken by an
edge.

VIEWS: drawings showing the facts of
form.

—, **TOP:** the view obtained by looking
directly down upon a form.

VIEWS, FRONT: the view obtained of an object when it is directly in front and opposite the eyes of the observer.

—, **SIDE:** the view obtained by looking at an object in a direction at right angles to that in which you looked for the front view, the various parts of the object being supposed to be on a level with the eye.

PATTERN: anything cut, drawn, or formed, to be used as a guide in making an object, and serving to determine its exact form and dimensions.

EDGE: the place where two faces meet.

CORNER: the space or contents included (within a short radius of the point of union) between faces, edges, or lines that meet.

OUTLINE: the defined limits of form.

LINE: the representation of length, but not breadth or thickness.

—, **STRAIGHT:** one whose direction remains the same throughout its length.

—, **CURVED:** one whose direction constantly changes.

HORIZONTAL: perfectly level.

VERTICAL: upright; straight up and down. A face, an edge or a line may be vertical.

OBLIQUE: neither horizontal nor vertical.

PARALLEL: being of unvarying distance apart throughout their extent. Faces, edges and lines may be parallel.

ANGLE: the difference in direction between two or more faces, edges or lines, which meet, or would meet if produced.

—, **RIGHT:** an angle of 90°.

—, **ACUTE:** an angle less than a right angle.

—, **OBTUSE:** an angle greater than a right angle.

PLANE FIGURE: one having the same direction throughout; perfectly even, as if made by a carpenter's plane.

TRIANGLE: a plane figure having three sides and three angles.

—, **RIGHT-ANGLED:** a triangle having one of its angles a right angle.

—, **EQUILATERAL:** a triangle whose three sides are equal.

—, **ISOSCELES:** a triangle having two of its sides equal.

—, **SCALENE:** a triangle, all of whose sides are unequal.

RECTANGLE: a figure, all of whose angles are right angles. A square and an oblong are rectangles.

SQUARE: a plane figure having four equal straight sides and four right angles.

OBLONG: a plane figure longer one way than the other, having four straight sides and four right angles. The opposite sides are equal and parallel.

RHOMBUS: a quadrilateral having four equal straight sides, and none of its angles right angles.

RHOMBOID: a quadrilateral which has its opposite sides equal and parallel, but none of its angles right angles.

TRAPEZIUM: a plane figure having four straight sides, no two of which are parallel.

POLYGON: a plane figure having many sides. A regular polygon is one in which all the sides are equal.

PENTAGON: a plane figure having five straight sides. A regular pentagon is one in which all the sides are equal.

HEXAGON: a figure having six straight sides. A regular hexagon is one whose sides are equal.

OCTAGON: a figure having eight sides; a regular octagon has eight equal sides.

CIRCLE: a plane figure bounded by an evenly-curved line called its circumference.

SEMICIRCLE: half a circle.

ELLIPSE: a plane figure having a regular curved outline and a long and a short diameter. It is like a flattened circle; a plane figure bounded by a curve, every point of which is at the same combined distance from two points within, called the foci.

OVAL: a plane figure longer one way than the other, bounded by curves that are symmetric as regards an axis.

TREFOIL: a triangular ornament with three leaf-like parts.

QUATREFOIL: a curvilinear figure of four leaf-like parts. It is much used in Christian art, and is there symbolic.

BASE: the part upon which a solid as a plane figure is assumed to rest. The ends of a prism are called its bases, though obviously it can rest upon but one at a time.

AXIS: an imaginary straight line passing through the centre of a solid or of a plane figure, and upon which it is assumed to revolve.

APEX: the part of the blade of a leaf opposite the leaf-stalk.

ALTITUDE: height.

DIAMETER: a real or imaginary straight line passing through the centre of a figure, terminating in its boundary, and dividing it into two equal and corresponding parts. The diameter of a straight-line figure connects the centres of the opposite sides.

DIAGONAL: a real or imaginary straight line connecting angles of a figure that are not adjacent.

CIRCUMFERENCE: the line bounding a circle. It is so curved that every point is equally distant from a point within the circle called its centre.

RADIUS: half a diameter of a circle; a line from the centre to the circumference of a circle.

ARC: any portion of the circumference of a circle or other curve.

BISECT: to divide into two equal parts.

TRISECT: to divide into three equal parts.

HUE: the characteristic of color that distinguishes it from any other color, as blue, red, etc.

tone: any state of a color as it passes from light to dark. Tones include tints, shades, and the normal tone.

NORMAL TONE: the typical or representative tone of any given color.

TINT: a tone of color lighter than the normal tone.

SHADE: a tone of color darker than the normal tone.

SCALE: the regular transitions from a color through succeeding modifications of it.

UNIT: the figure repeated in a decorative arrangement.

BORDER: repetition of a unit or portion of a design on a line.

ROSETTE: a decorative arrangement made by the regular repetition of units of design about a centre.



